THE IRON TRADE REVIEW

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Hard to Hold Present Prices

For delivery after April 1—Profound dullness in pig iron and finished materials

With only a few days of the first quarter remaining, interest centers in the question as to what prices will prevail during the second quarter. Present indications are that on finished materials mills will have difficulty in obtaining 1.20c, Pittsburgh, on shapes, plates and bars, and it seems certain that contracts written at higher prices will have to be revised. On these leading finished products, particularly plates and shapes in eastern territory, the 1.15c price, Pittsburgh, is being more openly made. A Baltimore company bought 450 tons of shapes and plates at an average price considerably below 1.20c, Pittsburgh. On bars, the 1.20c price is more successfully maintained than on plates and shapes, but the bar business is not in a satisfactory condition. The failure of agricultural implement manufacturers to place bar orders is an important factor in the present situation. These manufacturers state that they find that throughout the west a policy of economy prevails among the farmers so far as the purchase of agricultural implements is concerned. It is believed that many farmers are using their old implements and are buying automobiles. On the whole, the outlook in the finished material market is not favorable, but hope is still entertained that with the coming of warm weather, many activities will be quickened and the demand for iron and steel products improved.

Iron Ore

No action has yet been taken in regard to prices of Lake Superior iron ore, but furnace operators expect a reduction of 50 cents per ton below the prices for last year. It is expected that the opening of the season of navigation will be late this year. The first cargo of Wabana ore has not yet been shipped from Port Sidney.

Pig Iron

Pig iron quotations are being adhered to by northern makers in spite of the continued absence of demand, but in the south, weakness has developed, and it is understood that one southern furnace will sell at $10.50, Birmingham basis, for No. 2 for delivery over the next two months, while $10.75 is openly quoted.

Cast Iron Pipe

The leading cast iron pipe manufacturer has advanced its prices 50 cents per ton in the Chicago market, bringing quotations in that city in line with prices in other centers. Of 10,500 tons of cast iron pipe awarded by the city of Rochester, 8,700 tons went to the United States Cast Iron Pipe & Foundry Co., and 1,455 tons to R. D. Wood & Co. Cleveland will receive bids April 2 on about 8,000 tons.

Shapes and Plates

New business in both shapes and plates is light and specifications are coming in very slowly. The Southern railway has increased the tonnage of steel, for which it is inquiring, to 9,000, to be used in building cars. The number of awards of structural contracts in both eastern and western territory is lighter than for a number of weeks.

Coke

There are some indications of weakness in the coke market, but prices are pretty well adhered to. A strike on the Monongahela division of the Pennsylvania railroad has delayed shipments to plants dependent upon that division for coke and two blast furnaces are banked. Naturally the increasing probability of a strike by coal miners is being watched with much interest.

THE OPEN HEARTH

Will England Still Dictate?

IN NO part of the country does this question of Panama canal tolls bear down more heavily or have greater import than upon the iron and steel interests of Birmingham, Ala., and the south. Shut out in large measure by the ever-increasing localizing effect of freight rates, it is but natural that they should have some concern over the opening of the Panama canal with its potential value to that district as a factor in reaching more economically the largely increasing markets on the Pacific coast. Little wonder, then, that they are irritated over the prospect of an addition of one dollar per ton embargo upon this trade, as a dollar per ton may be just enough to prohibit profit.

Great Britain has in ships a number more than equal to the combined fleets of the world and she depends entirely upon them and their foreign commerce for her position and power. She has always absolutely dictated heretofore what the United States should do or should not do with reference to its merchant marine, as shown by the records of our state department and many historical works, dealing at length on this subject. It is only a question now as to what extent she will win again.

An Honest Labor Leader

A YOUNG man, Sidney Hillman, only 23 years of age, was the central figure of a remarkable scene recently in a labor union hall in Chicago. After a bitter struggle between thousands of garment workers and their employers, an agreement was reached. The hall was packed by the strikers and the question was whether the agreement should be ratified, as the union was in honor bound to do. Some, under the influence of a fanatic religionist, had taken oaths on the crucifix not to accept the agreement. Some of the radicals were doing their utmost to prevent ratification, when Sidney Hillman, who had been active in the negotiation of the agreement, calmly, but with great earnestness, declared, "You may take my life, but you shall not repudiate this agreement while I live."

Hillman won. The agreement was ratified, the strike ended and everybody was made happy. The method of reaching the agreement and its terms are described by enthusiasts as promising a working basis of a new industrial democracy and as promoting new idealism in industry. On this point, we are not sufficiently informed to express an opinion, but of one thing we are certain. If labor leaders in general could have the determination of Sidney Hillman to live up to an agreement sacredly made, there would indeed be a reign of good feeling between capital and labor such as this country has never seen. Then would employers be glad to make agreements with their employes. The astounding breaking of agreements by labor unions has been one of the principal causes of industrial strife.

Sidney Hillman is going to New York to enter the service of a labor union. Success to him! May he inspire not only his own union, but all of the unions of the metropolis to abide faithfully by every agreement entered into.

The Job Problem

WHAT shall be done about the man who wants a job and cannot get it? This question was discussed in New York City recently at a meeting described as the First National Conference on Unemployment, which was held at the instance of the American Association for Labor Legislation and the American Section of the International Association of Unemployment. More than 600 delegates, appointed by governors of states, mayors of cities, and by labor organizations, were present, and numerous solutions, more or less—mainly less—practical, were proposed.

The problem of unemployment is not new, but, on the contrary, is among the oldest in the history of the civilized world. In times of depression, when the problem becomes acute, we see and hear of the march of "Coxey's army" and other demonstrations of the unemployed. That a certain ratio of unemployment is always with us, however, is indicated by Federal reports, which assure us that even in normal times there is always a surplus of labor.

In Detroit, the Ford Motor Co. recently announced a policy of making a special effort to

THE OPEN HEARTH

keep its men employed during the winter season, when they could not obtain work on farms, and to reduce the factory force, when necessary, in summer, when the men could more easily obtain work on farms. Other manufacturers may find it possible to carry out this plan. Some employers doubtless will be willing to take on men whose special duty it would be to find temporary work for employes laid off. Much might be done by organizations to regulate the distribution of labor in the interest of both employer and employe. These and other suggestions have been made, but the sociologist is not always practical in his ideas and often, as in the case of the recent meeting in New York, manufacturers take no part in the discussion of the problem. Whether the absence of employers is their fault or not, it is unfortunate.

Good Year for Its Employes

IT IS highly gratifying to note that from the standpoint of the employe the past year has been very satisfactory to those who were fortunate enough to be on the payroll of the Steel Corporation. This great company failed in some respects to equal records of previous years. There was a slight decrease in production in semi-finished materials, wire products, sheets and tin plate, which caused the aggregate tonnage of production to fall off a little more than 1 per cent. The earnings, although very large, did not make a new record. But in spite of this fact, the number of employes and the aggregate payroll were the largest in the Corporation's history.

The size of the payroll was made greater by the general advance in wages and salaries to many employes on Feb. 1, 1913. The 25 per cent not affected were the higher paid wage earners and salaried men. These figures show the policy of the Steel Corporation to favor the men receiving comparatively small compensation, for the increase was about 12½ per cent in the case of employes receiving less than $2 per day. The average increase in the entire payroll was about 6 per cent, and the increased amount paid last year on account of this advance was about $12,000,000. This policy naturally encourages loyalty of employes, reflected in subscribers to the stock of the Corporation, who during the past year numbered 46,498, purchasing 90,606 shares. This made a new record both in the number of employes subscribing and in the total shares taken. The largest previous year was 1912, when 36,946 employes subscribed for 61,355 shares.

The question at this time arises—How long can the Steel Corporation keep up this generous policy? It not only continued the high wages after the slump came in 1913, but has steadfastly adhered to that policy this year. The test will probably come about July 1, unless business conditions improve very decidedly before that time.

A Valuable Publication

THE constant menace of any highly successful, well-known and well-advertised business by those who desire to profit by appropriating designs, names or trade marks is very fully, clearly and neatly set forth by an admirably printed book, recently issued by the Yale & Towne Mfg. Co.

Aside from giving a brief history of the company from its small beginnings until now, and a short biography of those who have made its name a household word in every part of the globe, it gives a most interesting resume of the various attempts that have been made both in this country and in Europe to profit by stealing some of the company's property, such as its designs, titles, numbers, etc.

That the courts have invariably (as indicated by decisions given in full) protected the Yale & Towne Mfg. Co., must be very comforting to that great institution and a warning to those who are to be found everywhere, engaged more or less in similar practices.

As a compendium of court reasoning upon this subject here and in Europe, the book has exceptional value and the Yale & Towne Mfg. Co. has performed a public service in giving publicity to the facts in such an admirable publication.

Prices Present and Past

Quotations on leading products today, average for last month, average for three months ago and average for March, 1913. Prices are those ruling in the largest percentage of sales at the dates named.

	Today's prices.	Average for Feb., 1914.	Average for Dec., 1913.	Average for March, 1913.
Bessemer pig iron, Pittsburgh..	$15.15	$15.09	$15.90	$18.15
Basic pig iron, Pittsburgh.....	13.90	14.09	13.71	17.03
No. 2 Fdy. pig iron, Pittsburgh	14.15	14.09	14.36	17.65
Northern No. 2 fdy. Chicago...	14.25	14.25	14.50	17.50
Ferro manganese, Baltimore....	38.00	38.75	46.50	64.25
Lake Superior char., Chicago..	15.75	15.50	15.50	18.00
Southern No. 2, Birmingham...	10.75	10.75	10.75	13.00
Southern Ohio No. 2, Ironton..	13.50	13.00	13.50	16.00
Basic, eastern Pa.....	14.25	14.15	14.00	17.50
No. 2X Virginia furnace.....	12.75	12.75	12.75	15.50
No. 2X Foundry, Philadelphia.	15.00	14.75	15.00	17.75
Bessemer billets, Pbgh. and Ygn.	21.00	21.00	20.00	29.00
Open hearth billets, Pbgh. & Yn.	21.00	20.75	20.00	29.50
Bess. sheet bars, Pbgh. and Yn.	22.00	22.00	21.00	29.50
Op. h'th sh. bars, Pbgh. & Yn.	22.00	21.75	21.00	30.00
Steel bars, Pittsburgh.....	1.20	1.20	1.21	1.40
Iron bars, Philadelphia.....	1.25	1.27½	1.27½	1.67½
Iron bars, Cleveland.....	1.25	1.25	1.30	1.65

	Today's prices.	Average for Feb., 1914.	Average for Dec., 1913.	Average for March, 1913.
Iron bars, Chicago mill.....	$ 1.15	$ 1.20	$ 1.15	$ 1.60
Beams, Pittsburgh	1.20	1.20	1.25	1.45
Tank plates, Pittsburgh.....	1.20	1.20	1.18	1.45
Sheets, blk., No. 28, Pittsburgh	1.90	1.94	1.88	2.35
Sheets, blue ann., No. 10, Pitts.	1.40	1.40	1.40	1.75
Sheets, galv., No. 28, Pitts....	2.95	2.94	2.87	3.50
Wire nails, Pittsburgh.....	1.60	1.59	1.55	1.75
Connellsville fur. coke, contr...	2.00	1.92	1.81	2.50
Connellsville fdy. coke, contr...	2.50	2.50	2.54	3.50
Heavy melting steel, Pittsburgh	12.25	12.37	11.00	14.25
Heavy melting steel, eastern Pa.	11.50	11.00	10.00	13.50
Heavy melting steel, Chicago...	10.50	10.50	9.00	12.50
Heavy cast, eastern Pa.....	13.00	13.00	12.50	14.00
No. 1 wrought, eastern Pa.....	14.00	14.50	13.00	15.50
No. 1 wrought, Chicago.....	9.75	9.85	8.50	12.00
Rerolling rails, Chicago.....	11.75	11.00	11.50	15.00
Car wheels, Chicago.....	12.00	12.25	11.75	17.25

(For Additional Prices See Page 610.)

Mills Hungry for Orders

And operations will be curtailed unless business improves

Office of The Iron Trade Review,
2148-49 Oliver Bldg.,
Pittsburgh, March 24.

Failure of consumers to cover future needs has had an unfavorable influence upon sentiment, and manufacturers regard the situation much the same as they did the latter part of 1913, when mill operations dropped below 50 per cent. No buying of consequence has been done since early February; railroads and agricultural implement makers show only a passive interest in the market and it is apparent that mills are getting hungry for tonnage. Another fortnight of inactivity will be followed by decided cuts in mill operations.

Heavy Lines Irregular

Prices, naturally, show effects of prolonged activity. Weakness in adjoining territories, where competition is keener, is more pronounced than here. Manufacturers are holding plates, shapes and bars at 1.20c, with some asking 1.25c, but occasional reports of tonnage going at 1.15c are heard. Attempts to establish these products at 1.25c for second quarter have been abandoned. Prices of other finished products are uncertain.

Turn in Sight

That prices will either advance or decline early in April is conceded; this is especially true with reference to plates, shapes and bars. In a measure, the same holds true with reference to pig iron, coke, scrap and semi-finished materials.

Furnaces May Go Out

Hall furnace, of the Republic Iron & Steel Co., at Sharon, has resumed operations on Bessemer; she was idle five months, but Fannie furnace, of the United Iron & Steel Co., at West Middlesex, probably will go out shortly, and other stacks will discontinue operations if conditions do not improve. Steel-making grades are decidedly quiet. Small lots of foundry and malleable are selling at $13.75 and $13.50, valley, respectively.

Billet and sheet bar manufacturers are asking $22 and $23, mill, respectively, for second quarter delivery, and, with only a few manufacturers offering material it is probable those figures will be established. No new demand is reported, but specifications still are liberal. Wire rods are quotable at $26, although some sellers refuse to shade $27, Pittsburgh.

Sheets Still Active

Specifications for steel sheets the first three weeks of March were practically equal to those received the corresponding period last month, and some new demand is evident. Irregularity features the market at some centers, but leading makers in this district are holding firmly. Tin plate mills are operating at almost maximum capacities.

A retarded spring has minimized activity in the wire trade. Specifications are not so brisk and consumers are not expected to enter the market until stocks are almost exhausted. Although prevailing prices have not been established, they represent the market as accurately as possible.

Specifications for steel rails, track material, iron and steel pipe, boiler tubes, nuts, bolts and rivets are coming out in fair volume, but are not so heavy as manufacturers wish. Railroads still hesitate about figuring in the market, apparently waiting for freight rate advances.

Delayed Shipments

A strike on the Monongahela division of the Pennsylvania has delayed shipments to some extent, but there appears to be plenty of coke on the market. Spot blast furnace fuel is selling at a range from $1.90 to $2, or 10 cents below the price of a week ago. Leading shippers are asking $2 and above for contract fuel. The *Connellsville Courier* says production the week ending March 14 was 353,405 tons, an increase of 7,715 over the week before.

The iron and steel scrap market is in the dumps. Mills are not anxious to contract and much material, usually acceptable, has been rejected.

(*For complete prices see page* 610)

Cast Iron Pipe Advanced

Bringing Chicago market in line—Pig iron not so firm

Office of THE IRON TRADE REVIEW,
1521-23 Lytton Bldg.,
Chicago, March 24.

The leading interest has advanced the price of cast iron water and gas pipe 50 cents per ton in this market, making 4-inch pipe $26.50 per ton, and sizes over 12 inches $24 per ton. This brings the Chicago market in line with prices in other centers. Lettings of cast pipe the past week were somewhat fewer than has been the case recently, but the lull is without significance. A letting of 1,600 tons at Cincinnati has not been awarded, the contract depending on thorough tests which have not been completed. The United States Cast Iron Pipe & Foundry Co. has taken 400 tons at Princeville, Ill.; 600 tons at Waterloo, Ia., and about 1,000 tons of gas pipe in various localities.

Pig Iron Less Firm

Although makers of pig iron in this territory still adhere to $14.25, Chicago furnace, for No. 2 foundry, it is a matter of speculation what an attractive tonnage might bring out. No business is current except small tonnages widely scattered, which are being taken at the prevailing quotation. It is believed in some quarters that this price could be shaded in case of a heavier tonnage.

An increasing tendency is noted on the part of melters to defer shipments, indicating foundries are not utilizing their full capacity or as much as was expected at the first of the year.

Although steel mills have sufficient tonnage on their books to run 30 to 60 days and specifications are continuing in reasonable volume, considerable anxiety is felt as to what will happen when makers begin to bid for business when present orders are more nearly completed. In the absence of railroad buying and with almost an absence of specifications from agricultural implement makers, new business is at a low ebb, though not as near to zero as was the case in December.

One maker reports somewhat better specifications from agricultural implement makers the past few days, but from the fact that almost all overbought and overproduced last season, not much relief is expected from this source until July 1. The same maker reports that March shows indications of a smaller total tonnage than February unless something happens within the next week to give an increase in the volume of specifications.

Some betterment in buying of iron bars by railroads is noticed in some quarters. It is made up of small tonnages from widely scattered buyers, but on the whole forms a pleasing aggregate. Steel plates show a somewhat better condition, but car buying is not showing sufficient volume to make this a factor.

Another Flood of Scrap

With the scrap market almost nominal and with almost no trading, the railroads have poured in offerings of about 16,000 tons of old material the past few days and dealers and users are wondering how it can be absorbed.

The Grand Trunk offers 2,100 tons; the Chicago, Peoria & St. Louis, 600 tons; Minneapolis, St. Paul & Sault Ste. Marie, 1,200 tons; the Great Northern, 5,600 tons; the Burlington, 2,000 tons; the Chicago & Alton, 700 tons; the Northern Pacific, 500 tons, and the Rock Island, 3,200 tons

The sheet market, which has been one of the strong factors, shows signs of weakening and several producers are booking for second quarter at open quotations at 1.90c and 2.90c for No. 28 gage black and galvanized, respectively, and also are offering No. 10 black at 1.40c. Some mills are shading even these figures by 50c to $1 per ton when situated strategically as to freight rates. In spite of these quotations, some makers are continuing to hold for 2c and 3c for black and galvanized.

While iron bars are quotable at 1.15c to 1.20c, business has been done recently at 1.12½c for desirable tonnages and it is suspected that 1.10c has been obtained in a few instances. A slight improvement in railroad buying of this material has had the effect of stiffening prices a trifle, so that shading of the minimum quotation is less apparent than a few days ago.

Structural shapes appear the strongest feature in the steel market and are quotable at 1.43c, Chicago, in the face of better buying than is the case in most other departments.

Lower Ore Price Expected

But buying will doubtless be late—Market is very dull

Office of THE IRON TRADE REVIEW,
Penton Bldg.,
Cleveland, March 24.

With April 1 only a few days distant, it is an interesting question to inquire as to whether the buying movement for this year's ore can be expected at any time in the near future and what the probable price will be. The buying for 1913 was done in November of the preceding year, that for 1912 in March of the same year, that for 1911 in April of the same year, that for 1910 in December of 1909, that for 1909 in May of the same year, that for 1908 in June of the same year, and that for 1907 in November of 1906. Owing to the extreme quiet which prevails in pig iron and finished materials at the present time, it will not be surprising if the record of 1908 is repeated. At the present time, there is no interest in the ore market and the only approach to making reservations has been most informal conversation. Furnace men expect a reduction of 50 cents below last year's prices and that reduction will no doubt be granted unless there is material improvement in conditions before the buying movement sets in.

Ore has been moving fairly well from dock to furnaces during the past three weeks but there will be plenty of it left on dock, May 1. The start will be unusually slow this year.

Pig Iron Still Firm

In spite of the continuation of the dullness which has characterized the pig iron market for a number of weeks, prices are being firmly adhered to. The test will come when general buying for the last half is inaugurated.

Dull in Finished Materials

Not only is the demand for finished materials extremely light, but the prospect for improvement is by no means encouraging. Men who have been in the business for many years say that seldom have they seen a time when there were so few indications of improved demand. Interest centers on the question—What prices will prevail during the second quarter? It is generally conceded that not more than 1.20c, Pittsburgh, will be the prevailing quotation on plates, shapes and bars. Specifications at present are coming in in a moderate volume.

No Demand for Scrap

An embargo was placed upon shipment to the plant of the Upson Nut

(*For complete prices see page* 610)

Co., Monday. The Otis Steel Co. is not in the market for scrap material. The Lake Erie Iron Co. is the only one of the three rolling mills that will even consider buying busheling and it offers only $8.25. A sale of steel axles was made last week at $16.85; we change quotations to $16.50 to $17. Otherwise, quotations are unchanged. Except for a few scattered sales among traders, the market is exceedingly quiet.

Rogers, Brown & Co. have been appointed sales agents of Rainey coke in the Cleveland district, succeeding the late James W. Thompson, who sold the coke in that district for many years.

Southern Pig Iron Weak

And concessions are being made— Very few sales reported

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg.,
Cincinnati, March 24.

The continued period of inactivity has caused southern prices to become dubious, and rumors of concessions being secretly made by furnaces are now being circulated. It is reported that one southern furnace will take a little business at $10.50, Birmingham basis, for No. 2 foundry iron for delivery over the next two months and one producer in Alabama and one in Tennessee are openly quoting $10.75, Birmingham basis, for first quarter business. The majority are holding at $11 and $11.50, Birmingham, for second quarter delivery, but these prices could be made to extend into the second half in several cases. Some warrant iron from the Dayton Coal & Iron Co., Dayton, Tenn., which is strictly No. 2 foundry, can still be had at $10.50, Birmingham basis.

The asking price for southern Ohio No. 2 foundry iron is $13.50, Ironton, for either prompt or forward delivery, but the only orders that have been booked at this figure are for a few carloads to fill in on old orders.

It has been many years since the market has been as quiet as it is at the present time. Demand is at a minimum and orders booked by local dealers during the past week have been far below the average in tonnage. A Jeffersonville, Ind., melter has closed for 400 tons of high manganese iron and a West Virginia manufacturer who was inquiring in this market for 1,200 tons of foundry for the second and third quarters has purchased this amount from valley furnaces. The Norfolk & Western railroad has closed for 600 tons of malleable.

Sheets More Active

The majority of makers of sheets in this territory report that the market has been a little more active during the past week and that from present indications, business done in March will be better than that of either January or February of this year or March of last year. Other makers state that the situation is quiet and that blue annealed sheets can now be had at from 1.55c to 1.60c, Cincinnati, which is slightly below the figures given last week. Black and galvanized sheets No. 28 gage are unchanged at from 2.15c and 3.15c, Cincinnati, respectively. Wire rods and billets are quiet and are given at $28.20 and $22.20, Cincinnati, respectively. Sheared plates are quoted at 1.35c, Cincinnati, which is 5 cents below last week's quotations. Buyers have been a little early in making their purchases this year, with the result that they are fairly well covered for requirements for several months. This has brought about the present lull in the market.

Warehouse business has been a little better during the past week. Twisted concrete reinforcing bars have been better in demand, which indicates that builders are beginning operations. Steel and iron bars are selling in fair lots, mostly for shipment outside of the city. Prices are unchanged and fairly strong.

Coke Requisitions Decline

Requisitions to forward shipments on old orders have fallen off a little during the past week, but they are still heavy. New business is at a standstill and not much buying is expected until melters begin to cover for the second half of the year. Jobbing foundries in this territory are barely operating and have sufficient coke on hand to last them for several months.

No. 1 machine cast has declined 25 cents per ton during the past week, being now quoted at from $10 to $10.50 per net ton. This material is generally the most active in this market, but at the present time it is the dullest, principally because foundries here are very inactive and are not buying even in small lots. The general market is very quiet and inquiries and sales are extremely light and scattered.

The Foster Bolt & Nut Mfg. Co., Cleveland, has placed contracts for the immediate erection of a large two-story brick addition to its manufacturing department. A new office building will also be constructed and an automatic sprinkler system will be installed throughout the plant.

For Second Quarter

Sales of finished materials made at present prices

Office of THE IRON TRADE REVIEW,
Buffalo, March 24.

Pig iron prices are being held firmly by the local furnaces, despite the quietness of the market. Sales for the week amounted to about 15,000 tons, equaling those of last week. Specifications continue to come in against contracts at a fairly good rate, there being a marked degree of urgency on the part of some consumers for prompt shipments, showing that the material ordered out is going into consumption rather than into stock. Most of the local interests are well booked up over the second quarter about to open. At the same time, there seems to be little interest shown in the market by either the producers or the buyers. Some of the melters report a slackening in trade, but this situation is considered temporary. There is a feeling of hopefulness that an improvement will set in, but no one at this time is ready to state how soon.

Price Quotations

The general business of the mills and agencies of the district is quiet. There is very little new buying. Specifications are coming in in fair volume against contracts closed in January, according to the reports of some interests. The amount of inquiry has increased slightly in the past week, but for small amounts of material for early needs.

Prices remain as previously quoted. There is no apparent disposition here to cut and the matter of the advance of $1 a ton that was to go on, for second quarter deliveries, will not be determined here until the end of the present quarter. Some material has been booked for second quarter delivery at first quarter prices.

Scrap Tends Downward

The market is still very quiet with a tendency towards lower prices. Sales of small tonnages have been made and the indications are that a buying movement is likely to develop about April 1, which will have a tendency to advance prices. In the meantime, there has been a softening in the schedules on wrought scrap, old steel axles, machine turnings, cast borings, Nos. 1 and 2 busheling scrap and wrought pipe.

(*For complete prices see page* 610)

Consumers Taking Iron

But buying is very limited—General conditions dull

Office of THE IRON TRADE REVIEW,
326 Real Estate Trust Bldg.,
Philadelphia, March 24.

There is no improvement in pig iron buying in the eastern Pennsylvania district and conditions continue exceedingly dull. Inquiry is small. Consumers are taking their shipments surprisingly well in view of the market's stagnation, and hold-ups are very few. Makers are not disposed to cut prices to bring out business and concessions are exceptional. The Reading Iron Co. has purchased 2,000 tons of standard forge from a Schuylkill valley maker at slightly below $14, delivered. The United States Cast Iron Pipe & Foundry Co. and some of the active pipe makers as usual are picking up odd tonnages and the former consumer is understood to be figuring on 10,000 tons or more, principally for southern plants. Sales of eastern Pennsylvania foundry irons are in small lots at the usual range of $15 to $15.25, Philadelphia, for No. 2X. Virginia iron remains at $12.75, furnace, for No. 2X. There is no new demand for basic at present, with prices ruling at $14.25 to $14.50, delivered. Low phosphorus is inactive. The Bethlehem Steel Co. has been taking some small lots of standard low phosphorus at the market, $21, Philadelphia. The first cargo of Wabana, Canadian iron, has not yet sailed from Port Sidney.

Eastern Furnace Changes

The Eastern Steel Co. has blown in its large No. 2 Warwick furnace, at Pottstown, to supply its steel plant and some unfilled merchant orders. Another furnace may be blown out later. The Alan Wood Iron & Steel Co. has put in one of its Swedeland, Pa., stacks and the Standish, N. Y., furnace of the Northern Iron Co. is resuming on low phosphorus.

Southern Increases Tonnage

The Southern railway, which has been inquiring for the steel for 1,500 cars to be built at its Lenoir City shops, has increased the quantity to 9,000 tons. This business is expected to go to Birmingham mills because of freight advantages, at 1.40c to 1.45c, delivered. New business and specifications in both plates and shapes are dropping off in eastern territory and the price of 1.15c, Pittsburgh, or 1.30c, Philadelphia, is more conspicuous. A Baltimore buyer took 450 tons of bars, plates and shapes from a western Pennsylvania maker at an average considerably below 1.20c, Pittsburgh.

Bar Specifications at 1.20c

Quite a good many steel bar specifications at 1.20c, Pittsburgh, are coming in, as well as considerable 1.15c tonnage. The present indications are that makers will be asked to revise 1.25c second quarter contracts to release specifications. As far as known, none of the leading makers have broken below 1.20c on new business. Eastern bar iron makers are complaining at the dull and weakened market. Bar iron is quotable 1.15c to 1.20c, mill.

Central Buys Slabs

The Central Iron & Steel Co., Harrisburg, has closed with nearby mills against its recent inquiry for 4,800 tons of open-hearth slabs. New orders for steel are not active, but specifications are full. The eastern forges are more active buyers. Billet prices are unchanged.

Sheet consumers will not buy ahead, but they are very urgent in demanding quick deliveries. Mill operations are sustained in this territory. Prices hold from 1.40c to 1.45c, Pittsburgh, for No. 10 gage blue annealed.

Government Wants Pipe

Bids were taken this week by the government on about 100,000 feet approximately 19 miles of ¼ to 10-inch galvanized iron or steel pipe, on 75 tons of wire and nails and on miscellaneous materials.

Scrap Materials Inactive

Light buying and a further drift towards easier prices characterize the eastern Pennsylvania scrap market. Heavy steel in tonnages is at $11.50, delivered, and brokers who were offering more have dropped their figures. Some consumers are picking up small lots of steel at $11, delivered. The Bethlehem Steel Co. continues to offer $7.75, delivered, for blast furnace borings. Sellers usually want more. Material is coming out more freely.

Present Prices Untested

In New York pig iron market—Good cast iron pipe sales

Office of THE IRON TRADE REVIEW,
503-4 West Street Bldg.,
New York, March 24.

Buying of pig iron remains almost totally suspended in the metropolitan and surrounding districts. The favorable fact remains, however, that requests for the withholding of shipments are very few. Sales of the week have been only of odd lots and pending inquiry is about 1,000 tons, including small requirements for the New York Central and Lackawanna railroads and for the Rapid Transit Development Co., a subsidiary of the Brooklyn Rapid Transit Co., and 300 tons for Connecticut delivery. An Irvington, N. Y., buyer divided 600 tons of second quarter Nos. 2X and 2 plain among Buffalo and other eastern makers. A sale of 500 tons of charcoal for export to continental Europe is noted. Little business has been done at the advances asked by Buffalo makers or, in fact, at any price, there or elsewhere. Present prices as a whole are untested.

Structural Orders Less

Eastern mills are receiving fewer specifications in plates and shapes as the result of the shrinkage in new buying. Structural offerings in this district, apart from subways, are light. Prices are easier and while 1.20c, Pittsburgh, or 1.36c, New York, still is being obtained in many cases, attractive tonnages can bring out $1 lower.

Andover Ore Re-Sold

About 10,000 tons of miscellaneous ores, which were on the banks of the Andover furnace, Andover, N. J., now about to be dismantled, have been resold to eastern furnaces. There continues no voluntary interest in ore among consumers and concessions would be necessary to effect sales. Some recent sales of magnetites have been made at 6¾c per unit, delivered eastern Pennsylvania.

Cast Pipe Tonnage Good

Rochester, N. Y., has distributed about 10,500 tons of cast iron pipe, of which 8,700 tons of 36-inch pipe and some specials, went to the United States Cast Iron Pipe & Foundry Co. at $21.90, delivered, for the pipe, and 1,200 tons of 6 to 16's, and 255 tons of 36's to R. D. Wood & Co. at $22, delivered, for the former and $21.89 for the latter sizes. The Standard Cast Iron Pipe &

(*For complete prices see page* 610)

Foundry Co. has taken 1,000 tons of 6 to 20's for Pawtucket, R. I., at $20.60, delivered, and R. D. Wood & Co., 715 tons of 10 to 16's for Northampton, Mass., at $21.25, delivered. Jas. McAvoy is low bidder on the contract involving 1,725 tons for the water department, New York City. Fall River, Mass., wants 680 tons of 6 to 12's for bids March 30, and Asbury Park, N. J., soon will be out for 650 tons of 12 and 24's. Cleveland will take bids April 2 on a large letting reported to involve 8,000 tons or more. The tonnage remains good and prices seem slightly harder.

Ferro Competitor Withdraws

The activities of a new English competitor in ferro-manganese, which precipitated the recent sharp flurry in this alloy, are understood now to be over, as this interest has withdrawn. The controversy between this seller of manganese ore and the foreign makers of ferro-manganese, is reported to have been adjusted. There remains an absence of sales or inquiries in this alloy. Prices are unchanged.

Foreign Bars Not Attractive

Sellers of foreign steel bars, who recently have canvassed consumers in this district and New England, have met with little success and declare there is practically no chance of doing business at ruling prices. The steel bar market appears to remain at 1.20c, Pittsburgh, or 1.36c, New York, but there is little new business moving. Bar iron is weak at 1.25c to 1.30c, New York.

Scrap Remains Lifeless

Only scattered transactions break the quiet trading in old material. With one or two recent exceptions in heavy steel, interest of consumers can be attracted to sizeable lots only by bargin offers. Car wheels are offered at $12, New York. Some small lots of blast furnace borings have been sold to an eastern Pennsylvania steel maker at $7.75, delivered.

Little Activity at St. Louis

Office of THE IRON TRADE REVIEW,
St. Louis, March 24.

All of the big buyers seem to have purchased iron far ahead of their immediate necessities, and until these supplies are used up, local sales agents do not expect any better conditions to prevail. The largest inquiry in the market today is for 400 tons of mixed grades, and about the largest sale made last week was one for 75 tons of southern No. 2. The Birmingham prices on southern No. 2 are $11 to $11.50, with no difficulty in obtaining the lower figure. Northern iron remains unchanged at Chicago and Ironton.

Coke continues to be inactive, with prices unchanged.

Old material is moving slowly, with a decline of 25 to 50 cents a ton on railroad wrought and locomotive tires. The Northern Pacific has a list out for 1,600 tons, and the Chicago, Burlington & Quincy one for 2,000 tons.

English Pig Iron Stocks Decline

New York, March 24.—The movement of Middlesbrough, English, pig iron from store, continues to keep ahead of the current make of the furnaces. In the week ended March 12 the reduction of Middlesbrough iron in Connal's stores amounted to 1,739 tons, which represents a total decline of 9,390 tons since the first of the year. On March 12 the Middlesbrough warrants were 129,274 tons. On the corresponding date in 1913, they were 217,397 tons. Stocks in the Cumberland district remain unchanged at 8,414 tons.

A loss of one active furnace is shown by the report of operations in the Middlesbrough district in the week of March 12. On that date, 75 stacks were blowing, compared with 76 stacks the previous week and with 88 stacks on the corresponding date in 1913. There was no change in the operations in the Cumberland district, which continue at 23 stacks, compared with 27 stacks in 1913. The Scotland situation showed unchanged with 73 furnaces blowing, compared with 91 active a year ago.

George R. Sullivan, who has been associated with the Philadelphia office of Rogers, Brown & Co. for 14 years, has been made resident manager in that territory, effective April 1. Mr. Sullivan succeeds Noah H. Swayne, second, who has resigned to engage in business for himself.

The shed of the Omaha boiler works, Omaha, Neb., was destroyed by fire, March 17. The machinery was but slightly damaged; origin of the fire unknown.

METAL MARKETS

New York

March 24.

Copper.—The refined copper market became rather quiet following the activity of last week, and for several days prices sagged off about ⅛c. Renewed buying by both domestic and foreign consumers developed Monday of the current week under which prices hardened. Today there is a scarcity of electrolytic at 14.50c delivered, and some of the leading selling agencies are asking 14.62½c. Lake copper is scarce and is held at 14.87½c and 15c. Casting is 14.37½c.

The London market closed strong today at £65 7s 6d for spot and £65 15s for three months.

Exports of copper since March 1 are 34,065 tons.

Tin.—Toward the end of last week, sentiment became very bullish in the tin market and buyers were anxious to secure the metal. There was very little inclination on the part of holders or speculations on the sheet side of the market, to sell however, so only a small total of business resulted. On Monday, the higher prices sent over from London induced some realizing though and transactions have been larger during the past two days. Spot and March sold today at 38.75c and April at 38.70c.

Domestic deliveries for March are estimated at round 4,600 tons, which will be close to the amount of arrivals at Atlantic ports for the same period.

The London market closed at £176 5s for spot and £178 for three months up £1 7s 6d since March 17.

Tin arrivals since March 1, aggregate 3,771 tons, and there are 3,872 tons afloat. The Banca auction will be held March 26.

Spelter. — The spelter market continues quiet, with prices unchanged at 5.25c in New York for spot and futures at ⅛c advance for each month.

Lead.—There is no change from the inactive condition which has prevailed for some time, and which appears to be due entirely to the waiting attitude of general business pending a settlement of the railroad rate question. Sellers are not inclined to make further reductions to induce buying. Spot lead is offered at 3.95c in New York, by some sellers, but the 4c is the general quotation.

Antimony.—The market is considered about as low as it can get in price, and any increase in buying will likely be accompanied by higher quotations. Cookson's is 7.25c; Hallett's is 7c; United States, 7c; and other brands from 5.87½c to 6½c.

Chicago

March 23.

Trading in metals is comparatively small and prices have registered small changes the past week. Casting copper is slightly stronger but sheet zinc has softened from $7.25 to $7 per hundred pounds.

We quote dealers' selling prices f. o. b. Chicago, as follows:

Lake copper, carload lots, 14.50c; casting, 14.625c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 5.20c; lead, desilverized, 3.90c; sheet zinc, $7.00, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 38.25c; Cookson's antimony, 7½c; other grades, 6.25c.

Quotations on old metals remain the same as for the past fortnight and are purely nominal. Almost no trading is being done and while accumulations in the hands of dealers are large in almost all items prices are too low for them to attempt to unload.

We quote dealers' selling prices f. o. b. Chicago as follows:

Copper wire, crucible shapes, 13.75c; copper bottoms, 12.00c; heavy red brass, 12.50c; heavy yellow brass, 9.25c; No. 1 red brass borings, 11.00c; No. 1 yellow brass borings, 8.25c; brass clippings, 9.50c; lead pipe, 3.85c; zinc, scrap, 4.25c; tea lead, 3.75c; No. 1 aluminum, 14.00c; No. 1 pewter, 24c; block tin pipe, 33½c; tin foil, 29.00c; linotype dross, 3c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3c.

(*For complete prices see page* 610)

Pig Iron is Remarkably Firm

In England, but prices are very near to the cost line —Finished materials not active

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., March 14.

In view of the general state of trade, the steadiness of the pig iron market is a remarkable feature. Prices are substantially what they were a week ago, fluctuations being too trifling to be worth consideration. Yesterday's quotations of Cleveland iron were 50s 6d ($12.36), with 3d extra for one month and 6d extra for three months. The amount in store is 129,000 tons, which shows that such slight change as is taking place in stocks is in the downward direction. Shipments are 25,000 tons up to the 10th of the month, which is about a moderate average. Apparently, there is an idea that German pig iron will be dumped into this country, although the basis for this expectation is rather difficult to discover. More furnaces have been closed down in the north of England, owing to the impossibility at the present rates of fuel and material to make a profit. It is agreed that fuel prices are quite 2s (48c) higher than they were five years ago, and this alone is responsible for an added cost of 3s (72c) per ton on pig iron. The steadiness of prices is due mainly to the fact that any further concession would mean an actual loss. One large Derbyshire smelter informed the writer at Birmingham on Thursday that every ton of forge pig iron sold involved a loss of 4s (96c), and that the furnaces would have to close down but for the fact that a certain amount of profit can still be earned on foundry iron, for which there is a very good demand. The activity of engineering continues in a wonderful manner, and this has been a very good windfall to the makers of foundry iron. Mixed numbers of East Coast hematite are selling at 62s ($15.18) for prompt delivery and 62s 6d ($15.30) for forward sales.

There is great complaining among makers of finished iron as to the very hard conditions under which business is now being transacted. It is generally believed that a critical time is approaching for many makers of finished iron in the Black Country. Profits have almost disappeared. In some establishments, not quite happily placed for cheap production, profit has given place to loss. A Midland manufacturer recently stated, "The less iron we roll, the less money we lose." Unmarked iron is now selling as low as £6 10s 0d ($31.86) per ton for average qualities, with lower prices for iron used in the making of nuts and bolts, locks, fences, etc. The selling price has often been lower than this, but production is relatively far more expensive than when such prices formerly prevailed.

The galvanized sheet trade maintains a fairly strong position and most mills are booked to the end of April. Quotations remain substantially on last week's basis, or at about £11 5s 0d ($55.12) per ton f. o. b.

The steel trade is making a slow recovery. Very large orders have been placed during the past few weeks, especially in connection with the shipbuilding industry.

A very good sign is that makers of thin steel plates in South Wales have found it possible to advance their quotations 5s ($1.22) per ton. There is an excellent demand for most descriptions of steel, but, as showing the keenness of foreign competition, Belgian steel bars are being delivered in the Midlands at £5 2s 6d ($25.10), whereas the recognized quotation for British material is about £1 ($4.88) in advance of this.

No Strike

In thirty-eight years—Result of co-operation

The Midland Iron and Steel Wages Board at its thirty-eighth annual general meeting, held in Birmingham, Eng., March 9, had a remarkable record of useful work to present. The representation established a new record comprising 55 works, covering six counties, including North and South Wales. Several additional firms have been added, including 11 firms affiliated to the Welsh committee, and representing the sheet trade. The chairman reviewed the history of the board, which commenced in 1873. For many years past, the standing committee had settled all matters under consideration, without having to appeal to the arbitrator, and there had been no strike for 38 years. Fortunately, wages were governed by the sliding scale. Within the past few months, they had enrolled 11 new works, and they now regulated the affairs of at least 30,000 work people. With regard to the iron trade, in 1909 a prominent member of the board questioned whether the iron trade was worth saving. That, fortunately, was an unfounded piece of pessimism, and iron had gained very much in favor since that time. It was believed that prices would be permanently higher, owing to increased cost, and so, of course, would wages rise proportionately. The Welsh committee now ruled the whole of the sheet trade in Great Britain.

J. Cox, speaking on behalf of the work people, expressed the belief that in 10 years time they would be making more iron than at present throughout the whole of the Midland district. It was decided to enlarge the standing committee and to alter the name of the Welsh committee to that of the sheet trade committee.

German Iron Trade

Berlin, March 11.—Notwithstanding the hopes to the contrary, there is still very little real improvement in the iron trade here. The pig iron syndicate, at its monthly meeting, reported, however, that a slight turn for the better had taken place, and that both special brands and Luxemburg iron had been purchased in considerable quantities for a week or two past; further, that the export trade had been a more liberal buyer, renewing important contracts that had run out. An unfavorable impression has been produced by the decision of the steel syndicate to maintain prices of half product, as well as for direct export business of finished steel. Prices of plates and shapes have now quite lost the improvement of some weeks ago, 97 marks ($22.79½) in the home market being now a very full quotation for plates, and 115 marks ($27.02½) for the best brands of sheets. In the export division the position is considerably worse, because with Belgium offering at 98 marks ($23.03), f. o. b. Antwerp, German mills cannot quote more than 93 to 94 marks ($21.85½-$22.09), f. o. b., for sheets. Some mills prefer to run their establishments only part of the time. The rolled wire syndicate reports that it has done better recently, its unfulfilled orders in the third week of February amounting roughly to 150,000 tons against 130,-

000 on Jan. 1. The German makers have made great efforts to enter the Austrian market more successfully, and in order to frustrate this, the Austrian works have cut prices sharply. Of cast iron pipe, for instance, the cut amounts to about 3 kronen (60 cents). The Austrian trade is in a poor state, the syndicated iron works shipping during January 8,275 tons less bar iron than last year; in girders, the decrease reached 4,737 tons; in plates there was a falling off of 1,341 tons. Rails, however, show an increase of 5,653 tons.

The Syndicate's domestic price for wire remains at $27.61¼ with a difference of $3.52½ per ton between rods and drawn wire. Rivet iron and horse shoe iron are lower at $35.95½ and $33.37, respectively. Hoop iron prices cannot apparently be maintained, figures as low as $25.85-$27.02½ being quoted. Some further prices in the plate department might be noted per English ton, as follows: Ordinary basic plates, $23.50-$23.97; medium sheets, $24.44-$24.91; lighter sheets, $28.20; with some transactions at $27.02½-$27.61¼; and boiler plates, $25.85-$26.32.

Belgian Iron Trade

Brussels, March 11.—A little better feeling is observable in the iron trade here, although many buyers still hold back in the belief that the advance in prices will not be maintained. Meanwhile a further advance has taken place in export prices, amounting to 24½ cents, and in one or two instances 49 cents. Thus steel bars are now $21.66; sheets of medium thickness, 3-32 inch, $25.80, against $25.31; ⅛ inch at $24.83, against $24.58½; and hoop iron is held for $28.72, against $27.99. Both orders and specifications have come in more satisfactorily, one of the chief orders booked being from the Servian State Railways for 48 locomotives and 1,200 freight cars. Hematite is offered in Belgian make at 85 francs ($16.15), German made being 2-3 francs (38-57 cents) higher. Ferro-silicon, 10-12 per cent, is 110 francs ($20.90) per 1,000 kilos. The ferro-manganese position has not changed much except that bottom at last seems to have been touched. The quotation appears to be about 210 francs ($39.90) delivered for 80 per cent material.

The Norma Co. of America, maker of Norma ball, roller, thrust and combination bearings, announces that it will remove its offices on April 11 from 20-24 Vesey street, New York, to 1790 Broadway, New York City.

Safety Work

Will be advanced by a national conference board

Representatives of the National Employers' Association, headed by William H. Barr, president of the National Founders' Association, held a conference at the Buffalo Club, Buffalo, on the afternoon of March 23, resulting in the creation of a conference board, with Mr. Barr as chairman, which is to advance safety and sanitary work in the shops of the members of the various organizations involved. Officers and members of the safety and sanitary committees of the National Founders' Association, the National Metal Trades Association, the American Foundrymen's Association, the National Electric Light Association and the National Association of Manufacturers participated.

The session was called to endeavor to help a co-operative spirit among the members of the various organizations for the inauguration of safety and sanitary work in the shops.

Mr. Barr was chosen chairman of the conference board. An illustrated talk was given on safety appliances and methods by Magnus W. Alexander, of the General Electric Co., West Lynn, Mass., chairman of the safety and sanitary affairs committee of the National Founders' Association.

Iron Workers Will Strike

A strike for a 48-hour working week, higher wages and sanitary shops is to be made by a new local union of inside iron workers in New York City, just organized as a branch of the International Association of Bridge and Structural Iron Workers. The new organization is composed largely of Hungarians, Jews, Poles and Frenchmen.

Will Be Dismantled

The Pennsylvania railroad has purchased the real estate and plant of the Andover blast furnace, Andover, N. J., and will build an embankment for its tracks through the property. This construction will necessitate the tearing down of the stack and the dismantling of the plant, and arrangements now are being made to carry out this program. All the ore and other manufacturing materials on the furnace bank have been sold. The Andover furnace was the property of the Wharton Steel Co., and has been inactive since 1910, when it was operated for a brief period following the death of Joseph Wharton, who some years before had purchased and modernized it. The three furnaces of the Wharton Steel Co. at Wharton, N. J., also have been inactive for several years.

Will Move to Chicago

St. Louis, March 24.—The closing of a deal for the purchase of the plant of the Chicago Gas & Electric Fixture Mfg. Co., by the Shiras Electric Co., of St. Louis, has been announced by Oliver Shiras, president of the St. Louis concern, who says the Chicago business will be moved to St. Louis and opened for business with a force of more than 300 men on or before June 1, 1914.

The Shiras Electric Co. is building a structure at Kienlen avenue and the Terminal tracks, in Wellston, a suburb of St. Louis 175 x 100 feet. Many cottages will be erected on the site for the workmen. Joseph Chassiang, general manager of the Chicago concern, will come to St. Louis, as vice president and general manager of the new plant; J. C. Mettler, chief designer, also will be brought to St. Louis.

The capital stock of the Shiras company has been increased to $150,000. Oliver Shiras will remain president; Robert Holmes, vice president; and C. E. Ashley, secretary.

The Taylor-Wharton Iron & Steel Co., High Bridge, N. J., has elected the following officers: Chairman of the board of directors, A. E. Borie; president, Knox Taylor; vice presidents, Dr. Henry M. Howe, V. Angerer and W. L. Wright; secretary and treasurer, W. A. Ingram.

Receiver B. F. McCann, of the Dayton Globe Iron Works Co., Dayton, O., has reported unsecured indebtedness of the concern as $127,474.32. He has asked the court to set a day for the hearing of the report.

The Sheet Metal Specialty Co., Goshen, Ind., advises its recent issue of $5,000 preferred stock was for the purpose of extending its business and to buy new machinery to provide for the making of its silo roof.

The Youngstown Sheet & Tube Co., Youngstown, O., has declared the regular quarterly dividend of 1¾ per cent on the preferred and 2 per cent on the common stock.

Railway Orders Still Slow

New York Central decides not to buy cars at present—Rail business light

New York, March 25. (By wire.)—The St. Louis & San Francisco has placed 6,000 tons of rails with the Tennessee company. The Soo Line has ordered 3,000 from the Illinois Steel Co. and 3,000 scattered are reported, in addition. About 4,000 tons of girders were taken by the Lorain Steel Co. for Chicago and Pacific coast delivery.

Railroad orders recently have represented only 10 per cent of the new bookings of some large makers.

Developments in the equipment market during the past week have emphasized the uncertain mind of railroad managers as to releasing important expenditures under the prevailing conditions, affecting the steam transportation interests. The New York Central lines, which about a week ago took bids from builders on 3,650 freight cars, have decided not to buy, notwithstanding the fact that attractive prices were tendered, it is understood. Other railroad companies are acting more slowly on equipment inquiries which recently they have placed before builders. For the week but one sizeable order, that for 500 refrigerator cars for the Illinois Central, awarded to the American Car & Foundry Co., is reported. The Chile Exploration Co. has placed 60 ore cars with the Pressed Steel Car Co.

Several important new inquiries for cars came out in the week. The Chicago Northwestern asked for 2,000 steel underframe box and the Great Northern for 1,000 wooden refrigerator cars. The Illinois Central has increased to 3,000 box cars its recent inquiry, originally reported as 2,500 cars, and, in addition, still is in the market for 500 box cars for the Central of Georgia. The Steel Corporation continues to negotiate for 2,500 gondola and hoppers for the Bessemer & Lake Erie and for 1,000 ore cars for the Duluth, Messabi & Northern. Total active inquiries for cars now pending are placed at about 12,000.

Rail business continues poor. Some eastern rail mills which have managed to run quite steadily for several years at part capacity, at least, now face complete shutdowns. The Chesapeake & Ohio railroad asks 3,000 kegs of spikes for second quarter.

Western markets are almost bare of car business, but builders are in hopes they will receive their share of several large orders which are pending, notably that of the New York Central, which is expected to be distributed in a short time. The Union Pacific railroad is in the market for 50 locomotives.

Heavy Tonnage

Pending for elevated and subways—Structural contracts

New York, March 25. (By wire.)—Structural lettings in the country last week made a fair showing, totaling 35,000 tons, of which 9,000 went to the American Bridge Co., including 1,800 for a Southern Pacific bridge at Coos River, Calif. Pending inquiries include 2,200 for the Chicago street viaduct, Buffalo; 1,000 for the St. Louis & Southwestern, St. Louis, and 900 for the Louisville & Nashville.

About 70,000 tons of elevated and subway work now in the market in the New York City make by far the principal structural requirement pending in the east. Most of this tonnage has been out for several weeks, but two new subway sections, requiring a total of about 8,000 tons, came out the past week. In addition, a deferred steel award of one section, 15,300 tons, was made. Apart from this award, the week in lettings in the east has been a poor one, aggregating less than 2,000 tons. New offerings are small.

Pittsburgh fabricators have had a dull week. Irregularity displayed by structural products has caused uncertainty in the price of fabricated material and reports of low prices are frequent.

At Chicago, absence of large lettings in the structural market, which have characterized the preceding two weeks, somewhat reduces the tonnage the past week and only 3,650 tons have been placed. The greater portion of this is to be erected in San Francisco and Los Angeles, and all but one item comes from west of the Mississippi. No new projects of magnitude have appeared for fabricators to estimate.

CONTRACTS AWARDED.

Haas Realty Co. building, Los Angeles, Cal., 1,300 tons, to the Baker Iron Works, Los Angeles.

Peck building, Kansas City, Mo., 920 tons, to the Kansas City Structural Steel Co., Kansas City, Mo.

Southern Pacific and Santa Fe R. R. Co., bridge over Islais Creek, at Kentucky street, San Francisco, 400 tons, to Milliken Bros.

Illinois Vinegar Mfg. Co., buildings, Chicago, 285 tons, to Bolter's Sons, Chicago.

Labor Temple, San Francisco, Cal., 260 tons, to Central Iron Works, San Francisco.

The Cincinnati Iron & Steel Co., Cincinnati, will furnish all of the reinforcing steel to be used in the new Hopple street viaduct, Cincinnati, the construction of which will be begun within the new future. From 1,600 to 1,800 tons will be required. The viaduct will be built by the Kirschner Construction Co., Cincinnati.

P. J. Gartland Apartment building, San Francisco, 250 tons, to Central Iron Works, San Francisco.

J. L. Walker building, Phoenix, Ariz., 234 tons, reinforcing bars.

The Cincinnati Iron & Steel Co., Cincinnati, have received the contract to furnish all of the reinforcing steel to be used in the construction of the new Ludlow street viaduct, that city, of which about 1,000 tons will be required. Work will be begun as soon as the weather permits.

Electrification work on Chestnut Hill division out of Philadelphia, of the Pennsylvania railroad, 500 tons, awarded to the McClintic-Marshall Co.

Three bridges for Boston & Maine Railroad, 300 tons awarded the Boston Bridge Works.

Ardsley Garage, East Seventy-second street, New York City, 400 tons, awarded to the Geo. A. Just Co.

Eight cottages for woman's reform school, Bedford, N. Y., 400 tons, awarded to the American Bridge Co.

Bridge, 250 tons, for New York Central railroad at Kings Bridge, N. Y., awarded to the American Bridge Co.

Steel work, 15,300 tons, for Jerome avenue elevated railroad section, Manhattan, awarded by general contractors, Cooper & Evans, to independent fabricators, reported to be Milliken Bros., Inc.

Bedell department store building, Pittsburgh, 230 tons, McClintic-Marshall Co.

Lackawanna Steel Co., Buffalo, 1,500 tons steel sheet piling for Toronto harbor improvement work.

Cambria Steel Co., 140 tons reinforcing bars for New York State Railways, Syracuse, N. Y.

Buffalo Structural Steel Co., 550 tons of steel for service building addition to Pratt & Letchworth Co.'s plant, Buffalo, N. Y.

Lackawanna Steel Co., Buffalo, 1,500 tons steel sheet piling for Toronto harbor improvement work.

Cambria Steel Co., 140 tons reinforcing bars for New York State Railways, Syracuse, N. Y.

Buffalo Structural Steel Co., 550 tons of steel for service building addition to Pratt & Letchworth Co.'s plant, Buffalo, N. Y.

CONTRACTS PENDING.

The Jones & Laughlin Steel Co., Pittsburgh, has submitted the most satisfactory figures for the structural steel to be used in the new 18-story addition to the Union Trust building, Cincinnati. Approximately 1,000 tons will be required. D. H. Burnham, architect, of Chicago, is in charge of construction.

Sealed proposals for any and all branches of work will be received by the director of public service, of Norwood, O., a suburb of Cincinnati, for the construction of a city hall in accordance with plans and specifications prepared by Weber, Werner & Adkins, architects, Cincinnati. About 1,000 tons of structural steel will be required in addition to ornamental iron work and special metal work.

Gustave deKimpe, Hoboken, N. J., low bidder for 300 tons of steel for Forestry building, Syracuse university.

Gustave deKimpe, Hoboken, N. J., low bidder for 300 tons of steel for Forestry building, Syracuse university.

Methodist office building, Philadelphia, about 500 tons, bids being taken.

Bridges for Pennsylvania railroad on eastern division, 450 tons, bids being taken.

Alterations to Harvard Club, West Forty-fourth street, New York City, 820 tons, Marc

Eidlitz & Son, awarded general contract. Steel work unplaced.

Loft building, for Goelet estate, Thirty-seventh street and Fifth avenue, New York City, about 4,000 tons, bids about to be asked.

Seven bridges for New York Central and Hudson River railroad, 900 tons, bids taken.

Section No. 1 of Broadway, Lexington subway line, New York City, 4,750 tons, bids to be received April 13.

Section No. 1, Seventh avenue subway line, New York City, 3,380 tons, bids to be received April 17.

Strike Causes Banking of Furnaces

Pittsburgh, March 25. (By wire.)—Blast furnaces dependent upon the Monongahela division of the Pennsylvania for sources of supplies are having difficulty in obtaining coke as the result of a strike among brakemen and conductors of 15 crews. The Donora works of the American Steel & Wire Co. has been affected. Both blast furnaces are banked. Nearly all other plants of the division have connections with other roads. The strike probably will be settled today.

Will Submit Rebuttal Testimony

New York, March 25. (By wire.)—Government counsel in the United States Steel Corporation dissolution suit will begin taking rebuttal testimony tomorrow. Documentary evidence mostly will be entered and the government expects to close its case within two weeks.

Proposed Canadian Duties

The attitude to be taken by the finance minister of Canada is being awaited by Dominion business interests. He is scheduled to read his budget March 26.

There was a meeting at the King Edward hotel, Toronto, called by the two Canadian rod manufacturers—the Steel Co. of Canada, Hamilton, and the Dominion Iron & Steel Co., Halifax—attended by Canadian users of rods. Its purpose was to get all interests together to urge the government to place a duty on rods, and then to have the influence of the rod manufacturers in turn used to get the government to also place a duty on fence wire, drawn from rods.

The statement is current among interests on this side that if Canadian interests are to work for the adoption of such restrictive rather than reciprocal tariff measures, it is about time that American interests begin to discuss the advisability of placing a duty on the coal going into Canada.

Light Bookings

But some mills report improvement over preceding week

New York, March 25. (By wire.)—Some large steel makers report some improvement the past week both in new business and specifications over the preceding week, but bookings are still running considerably behind February. The United States Steel Corporation's unfilled tonnage report for March is expected to be much less favorable than that of February. Operations of the leading interest are unchanged this week.

Economy of Farmers

The Van Brunt Mfg. Co., Horicon, Wis., plans to continue operations until about July 1 with two-thirds of its full force. If sales conditions are not improved at that time, it will be necessary to close the plant for about two months. The company finds that there exists a general desire for economy upon the part of farmers and experiences greater difficulty in interesting them in the purchase of new implements than has existed for several years. This has resulted in a decrease in the implement business generally and it will be necessary to operate factories on light schedules until more favorable conditions are developed.

Imports Decreased

Washington, March 24.—According to figures made public yesterday by the Bureau of Foreign and Domestic commerce, Department of Commerce, imports of iron and steel, save cutlery, tin plates and bar iron, into the United States during the first four months since the enactment of the Underwood-Simmons tariff law, show a decrease of nearly $1,000,000 when compared with those of a like period a year ago. The period, Oct. 4, 1913, to the end of January last, showed a total of $10,219,000, compared with $11,077,000 in a similar period ending with January, 1913. The greater part of the decrease occurred in January. October showed a decrease of $199,000; November, a decrease of $298,000; December, an increase of $166,000, and January a decrease of $526,000, in comparison with the respective months of the preceding year.

Southern furnaces have sold 3,000 tons of pig iron for Australia.

By Product Plant

Will be built by Steel Corporation at Farrell, Pa.

New York, March 25. (By wire.)—The United States Steel Corporation has appropriated about $400,000 for a by-product plant at Farrell, Pa., to refine coal tar and produce crude gasoline. This is the first plant of its kind the Corporation has yet undertaken. Heretofore at Farrell only coal tar and sulphate of ammonia have been made.

The bar mill of the Tennessee Coal, Iron & R. R. Co., is to be remodeled to increase its capacity.

Obituaries

John D. Logan, formerly connected with the Logan Iron Works, at Greenpoint, Brooklyn, died at his home in Hillside, N. Y., March 16, aged 51 years.

Edwin N. Coryell, a consulting engineer, died suddenly, March 24, at his office in New York City, from an attack of heart disease. He was 65 years of age. For about 30 years he had been consulting engineer for the Cameron Steam Pump Co., New York City.

Harry K. Woods, 47 years old, superintendent of the steam and pipe fitting department of the La Belle Iron Works, Steubenville, O., and organizer of the Woods Valve & Machine Co., that city, manufacturer of hydraulic valves, died March 18. Mr. Woods invented the valves manufactured by his company. He was born in Sweden.

Eugene L. Bruce, for many years connected with the Crane Co., Chicago, and recently head of the Pittsburgh office, died at Columbus, O., last week, from injuries sustained in an elevator accident. He was born at Denver. Before becoming associated with the Crane Co. Mr. Bruce was assistant purchasing agent of the Colorado Fuel & Iron Co., Denver.

A. L. Andrews, president of the Newport Rolling Mill Co., Newport, Ky., has been elected vice commodore of the Gilbert Bar Yacht Club, of Sewalls Point, Fla., which is one of the most noted clubs of its kind along the Florida coasts. Mr. Andrews has spent considerable time during the past winter in Florida.

W. P. Snyder, president W. P. Snyder & Co., Pittsburgh, has returned from Palm Beach, Fla., where he spent the winter.

Harlan, a Man of Great Ability

Presides over the Interstate Commerce Commission—In charge of advance rate case

Washington March 24.—The extreme importance of the so-called 5 per cent advance rate case of the eastern railroads has caused the eyes of the nation to be riveted upon the Interstate Commerce Commission. Quickening of the wheels of industry is claimed to rest largely on the outcome of this problem. Its solution necessarily requires rare ability, which is not only sufficient to grapple with and conquer the many intricacies involved, but also can look at the question under review coolly and fairly, in spite of all clamor and agitation.

Such faculties are at all times requisites of a member of the commission, but have never been more necessary than in the pending advance case.

The factors entering into the issue, which has evolved innumerable difficult ramifications, demand a master mind to direct a case of this kind. Such a man, therefore, for the present, is as much in the eye of industrial circles as is the president of the United States, although by position rather than by name.

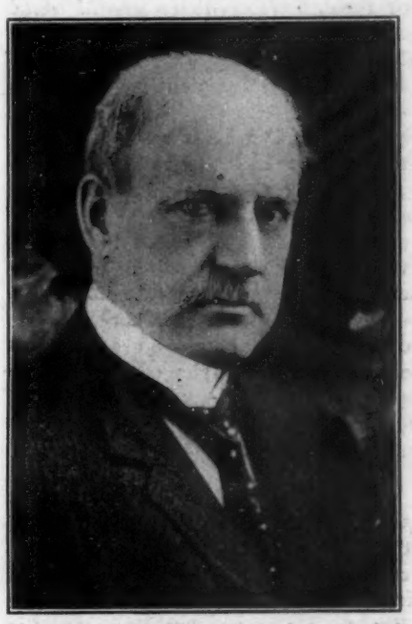
James S. Harlan is in direct charge of this great case. His qualifications, both by training and acts, it would seem, fit him admirably for the task at hand. On March 17, Mr. Harland began his duties as chairman of the commission, having been appointed according to the policy of that body for one year in view of his seniority of service. He succeeded Edgar E. Clark.

The new honor will attract to Mr. Harlan more notice than ever, and the name he bears, familiar throughout the country, will gain deservedly the attention that the chairmanship attaches to it in addition to that given the other commissioners. Commissioner Harlan's activities, however, have made him well known to the professional, railroad and shipping world.

A big man, both intellectually and physically, vigorous and yet in the prime of life, he carries his responsibilities without an outward sign of their exactions. His finely poised and well disciplined mind and pleasant address are characteristics which appeal to those with whom he comes in contact and the impression is lasting.

Mr. Harlan was born Nov. 24, 1861, and comes from a prominent Kentucky family, his father being the late John Marshall Harlan, associate justice of the Supreme Court of the United States from Nov. 29, 1877, until his death, Oct. 14, 1911, a period of practically 34 years.

Commissioner Harlan was graduated from Princeton University with the degree of A. B., in 1883, his preparatory education having been acquired in the schools of Louisville, Ky. After leaving Princeton, he studied in the Columbia University law school, and then, from 1884 until 1888, continued the study in the office of the late Melville W. Fuller, who gained the great eminence of chief justice of the Supreme Court of the United States. Mr. Harlan was admitted to the bar in 1886, and practiced at Chicago, be-



JAMES S. HARLAN

ing at first a member of the firm of Gregory, Booth & Harlan, and later a member of the firm of Harlan & Harlan, his partner in the latter firm having been a brother, John Maynard Harlan, twice a candidate for mayor of Chicago. Both men like their illustrious father, became prominent through their practice. A third brother, Richard Davenport Harlan, is a well known educator and theologian, and was formerly president of Lake Forest College, Lake Forest, Ill., a Presbyterian institution. Later, he was associated with George Washington University, Washington.

In 1901, Mr. Harlan was appointed by President Roosevelt attorney general of Porto Rico, and distinguished himself in that office, which he resigned in 1903. On Aug. 17, 1906, he received his first appointment as a member of the Interstate Commerce Commission from Illinois, and has been reappointed from time to time. His present term expires Dec. 31, 1918.

Mr. Harlan possesses the faculty of doing much and with quietness and reasonable dispatch always giving attention to complete deliberation of the question in hand, so that when finished it will be a product of precision and justice as he views it. He has performed an immense volume of work since his incumbency, which has included many important decisions and other labors.

To the world with which he comes into direct business association, Commissioner Harlan is best known as the commissioner who has direct charge of the advance case, and the one who prepared the important reports in the tap lines and industrial railways case.

Preparing to Entertain

The date of the annual convention of the National Association of Sheet Metal Contractors, which will be held in Cincinnati, has been changed to next June 16, 17, 18 and 19. This was done through the advisement of the Cincinnati Sheet Metal Club, as hotel accommodation in that city could not be conveniently had until the above dates. The Cincinnati Sheet Metal Club is making elaborate preparations for the entertainment of the delegates to the convention and has elected the following officers to take charge of preliminary matters: President, E. W. Edwards; first vice president, William Stechow; second vice president, Albert Boubinger; secretary, F. F. Verges; assistant secretary, Charles L. Smith; and treasurer, Charles E. Pfau. The following chairmen of committees have been chosen. Halls and exhibits, Charles Kobman; financial, Charles A. Pfau; press, G. E. Myers; hotel and headquarters, O. S. Larkly; entertainment, C. S. Fitzwilson; banquet, John Pack, and membership, E. J. Becker.

A 5-story building occupied by the Houghton-Detroit Elevator Co., Detroit, Mich., was badly damaged; loss about $40,000.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

C. N. Hickox, of M. A. Hanna & Co., Cleveland, has started on a trip to the Bermudas.

L. H. Elliott, of the Bourne-Fuller Co., Cleveland, has returned from a short visit to Asheville, N. C.

W. H. Eulass, manager of the New York office of Joseph T. Ryerson & Son, left recently for a few weeks' trip through the south.

John D. Hibbard, Chicago, commissioner of the National Metal Trades Association, has returned from a stay of a month at Tampa, Fla.

Frank N. Roby has been appointed assistant superintendent of the open-hearth plant and blooming mill of the Upson Nut Co., Cleveland.

E. W. Richey, formerly secretary and general sales agent of the Standard Forgings Co., has become associated with A. M. Castle & Co., Chicago.

E. C. Welborn, formerly assistant treasurer of the Allis-Chalmers Co., Milwaukee, has accepted a position in the credit department of the Illinois Steel Co.

E. G. Rust, formerly connected with the Jones & Laughlin Steel Co., Pittsburgh, is now general superintendent of the Wheeling Steel & Iron Co., Wheeling, W. Va.

J. W. Sheperdson, assistant chief engineer of the Cambria Steel Co., Johnstown, Pa., has accepted the position of assistant general superintendent of the Central Iron & Steel Co., Harrisburg, Pa.

H. J. Meehan, superintendent of the Lackawanna Coal & Coke Co., at Wehrun, Pa., has resigned to become general superintendent of mines for the Cambria Steel Co., Johnstown, Pa., succeeding James W. Cook, who resigned Jan. 1.

H. A. Rapelye has been appointed sales engineer in the Pittsburgh district for the Terry Steam Turbine Co., Hartford, Conn., with offices at 2123 Oliver building, Pittsburgh. Mr. Rapelye has had broad experience with steam turbine apparatus.

William H. Hulick, director of the Thomas Iron Co., Hokendauqua, Pa., has resigned and has been succeeded by Daniel Steckel, of Easton, Pa. Mr. Hulick recently was elected president of the Warren Foundry & Machine Co., Phillipsburg, N. J.

E. John Hicks has become connected with the Merchants' Steel & Supply Co., Chicago, of which he has been made vice president. He will have charge of the scrap department. Mr. Hicks was formerly associated with the James S. Miller Co., of Chicago.

Wm. P. Mullane, has been appointed superintendent of the Sylvan works of the Republic Iron & Steel Co. at Moline, Ill. He has been assistant superintendent of this plant and succeeds Oscar Black, who goes to the Inland works of the Republic at East Chicago, Ind.

Dorsey A. Lyon and Robert M. Keeney, stationed at the Pittsburgh laboratory of the United States bureau of mines, have been temporarily transferred to Salt Lake City, Utah,

FRED C. DEMING,
New Member of the American Iron and Steel Institute

to start the co-operative federal-state work of the school of mines of the University of Utah.

Walter Wood, of R. D. Wood & Co., Philadelphia, has returned from an extended business trip abroad. Mr. Wood has announced further details regarding the large contract for cast iron pipe recently reported, which his company has obtained for a water line in Italy.

Howard L. Warner, who has been connected with the main office of Frank Samuel, Philadelphia, dealer in iron and steel scrap, pig iron, etc., has been placed in charge of the New York office of that firm at 39 Cortlandt street. S. Anderson, the former manager, has resigned.

Charles T. Lamb, for many years assistant treasurer and office manager of the F. E. Reed Co., Worcester, Mass., lathe manufacturer, and for the past two years office manager for the Reed-Prentice Co., that city, has resigned, effective May 1. He will engage in other business.

Gustav Klaas, a noted mechanical engineer of Riga, Russia, spent the week of March 16 in Cincinnati inspecting the different machine tool plants in that city. Mr. Klaas will attempt to introduce American made machinery into Russia extensively upon his return to that country.

O. P. Wilson, of the purchasing department of the Westinghouse Electric & Mfg. Co., Pittsburgh, has resigned to become assistant general manager of the Norma Co. of America, New York City. The company manufactures and imports high grade ball bearings, roller bearings, etc.

A. E. Borie has been elected chairman of the board of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J. The other officers elected at the annual meeting were Knox Taylor, president; Dr. Henry M. Howe, W. L. Wright and V. Angerer, vice presidents, and W. A. Ingram, secretary and treasurer.

Fred C. Deming, manager of sales of the Carnegie Steel Co., the Tennessee Coal, Iron & Railroad Co., and the Illinois Steel Co., at Buffalo, was born in that city March 5, 1868, was educated at the Buffalo State Normal school. In 1884, he was employed by the Philadelphia & Reading Coal & Iron Co., and from the position of office boy, he was rapidly promoted. In 1892 he became a salesman of the Carnegie Steel Co. in the Buffalo district. In 1900, Mr. Deming was promoted to be assistant manager of sales at Buffalo, which he held for ten years. On Aug. 1, 1911, he was made manager of sales of the three companies. Mr. Deming is a member of the American Iron and Steel Institute and of several Buffalo clubs.

Cecil A. Robinson, Wheeling, W. Va., has been elected a director of the La Belle Iron Works, Steubenville, O., to succeed Isaac M. Scott, who tendered his resignation some time ago to devote his time entirely

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

to the Wheeling Sheet & Tin Plate Co., Yorkville, O., the plant of which was described in the Jan. 1 issue of THE IRON TRADE REVIEW.

M. F. Doty has accepted the position of sales manager for the Sivyer Steel Castings Co., Milwaukee, Wis. He was formerly western sales manager of the Isaac G. Johnson Co., Spuyten Duyvil, N. Y.

R. J. Young, manager of the department of safety and relief of the Illinois Steel Co., delivered an address illustrated by stereopticon slides on "Practical Methods of Creating and Maintaining the Interest of Men in Safety Work", before Chicago local

NOAH H. SWAYNE

council No. 3 of the National Council for Industrial Safety, at the City Club, Chicago, March 18.

W. W. Williams, connected with the sales organization of A. M. Byers Co., Pittsburgh, has been appointed general sales manager of that company, and T. L. Lewis has been appointed assistant general sales manager. W. W. Weller, formerly manager of sales, has been appointed eastern sales manager with offices in the Woolworth building, New York City.

J. W. Henderson, of Gulick-Henderson, Pittsburgh, has been appointed head of the Pittsburgh bureau of smoke prevention, succeeding J. M. Searle. Mr. Henderson at one time was superintendent of the Maryland Car Wheel Co.'s plant at Baltimore; later he managed the Verona, Pa., plant of the Standard Steel Car Co., and more recently was connected with the Whiting Foundry & Equipment Co., at Buffalo.

Col. H. G. Prout, formerly general manager of the Union Switch & Signal Co., Pittsburgh, has been elected president of that company, to succeed the late George Westinghouse. Col. Prout went to Pittsburgh in 1903, to become general manager of the Switch & Signal company's plant, after a long experience with railroad activities. Col. Prout at one time was in the British army. He is a graduate of the University of Michigan.

E. F. Platt, formerly connected with the Platt Iron Works, Dayton, O., and C. A. Kurz Jr., of the Kurz Laboratories, have recently organized the Electrolytic Gas Co., which has secured the western selling agency of the International Oxygen Co. of New York, and it will proceed with the installation of a number of electrolytic plants of the International Oxygen Co. System for the production of oxygen and hydrogen in different parts of the country.

Noah H. Swayne second, manager of the Philadelphia office of Rogers, Brown & Co., who will sever many years' connection with that firm, April 1, to engage in business for himself, as recently reported, was born at Toledo, O. After graduating from Yale with the class of 1893, he took up the practice of law in New York City with his father, Gen. Wager Swayne. While thus engaged, he became associated with Rogers, Brown & Co., and in 1900 was made president of the Alabama & Georgia Iron Co., Cedartown, Ga. He operated the Cherokee furnace of this company until 1904, when he was made president of the Nittany Iron Co., Bellefonte, Pa., operating that furnace until 1906. On April 1 of that year, he became resident manager of Rogers, Brown & Co., at Philadelphia, a post he has held up to the present time. Mr. Swayne is an accomplished musician, appearing frequently in concert work. He is active in Yale University alumni affairs. His grandfather, Noah H. Swayne, served upon the United States Supreme Court, having been appointed by President Lincoln.

Burt H. Whiteley, one of the organizers of the Whiteley Malleable Castings Co. and the Whiteley Steel Co., both of Muncie, Ind., has established a charity fund to provide medical services for indigent residents of that city. The foundation, which will be known as the Burt H. Whiteley charity fund, includes an immediate gift of $2,500 and the setting aside of securities in trust, which will provide an annual interest of not less than $10,000. This sum is to be used in caring for all cases of sicknesses, accidents and emergencies, other than

BURT H. WHITELEY

contagious diseases, for those residents of Muncie, financially unable to provide themselves with proper medical or surgical attention. In his anxiety to prevent defeating the objects of the fund through "red tape", Mr. Whiteley provides that all cases where medical or surgical attention is imperative, shall be sent to a hospital and investigation made later. Mr. Whiteley announced this gift after an extensive investigation of various similar foundations and has incorporated several original modifications. He himself has been in ill health for some time, but has improved, as the result of a trip to Panama and Central America, from which he has just returned.

Public Must Foot Higher Bills

If new tariffs are allowed to stand, say Steel Corporation petitions—National capital news

Washington, March 24.—Eleven additional petitions were filed last Friday with the Interstate Commerce Commission by manufacturing subsidiaries of the United States Steel Corporation in protest against tariffs filed by trunk lines cancelling joint rates and through routes with so-called industrial lines. Like previous petitions, they request the commission to suspend the tariffs and to grant hearings as to the propriety of the rates and charges in each of the tariffs, and, finally, that an order be entered that the tariffs are unjust and unreasonable, and, being in violation of the act to regulate commerce, the line carriers be compelled to desist from enforcing the tariffs, which, it is asked, shall be amended to meet the rights of the petitioners.

Included in the list of petitions is a joint supplemental one of the Carnegie Steel Co., and the Universal Portland Cement Co., seeking suspension of some 500 enumerated tariffs, which cancel all of the stations on the line of the Union Railroad. It is claimed these tariffs would make it practically impossible for industries along the Union railroad to handle its traffic in interstate commerce. Its rates, if the cancellation tariffs become operative, would no longer enjoy any relations with those on trunk lines. For example, these tariffs would compel the Universal Portland Cement Co. to ship its products from points in some cases 15 miles from the original point of shipment. The Carnegie Steel Co. would suffer similarly. To specify a case, it is only necessary to refer to the fact that the Wabash Terminal railroad delivers material to the Union railroad at Mifflin Junction, Pa., 15 miles from Universal, Pa., where the plant of the Universal Portland Cement Co. is located. With the cancellation tariffs in effect, Universal, being on the Union railroad, will share no rights whatever with the trunk lines, whose tariffs will not even carry the name of the town. A shipment made from the plant of the Universal Portland Cement Co., say to Chicago, will show Mifflin Junction as the point of origin, according to the proposed tariffs.

The five petitions of the Carnegie company exclusively relate to its steel works and furnaces at Farrell, Pa., on the line of the Mercer Valley railroad; the Lucy furnaces in Pittsburgh, on the B. & A. V. division of the Pennsylvania railroad; its steel works at Clairton, Pa., on the St. Clair Terminal railroad; Edith furnace, Allegheny, Pa., and its Neville furnace, Neville Island, Pa., on the Pittsburgh & Ohio Railway Co.'s line, and the Isabella furnaces, Etna, Pa., on the Etna & Montrose railroad.

The American Steel & Wire Co. filed three petitions, one for its Shoenberger furnaces and steel works in Pittsburgh, on the Northern Liberties railroad; a second for its steel works in Donora, Pa., on the Donora Southern railroad, and a third for its steel works in Farrell, Pa., on the Mercer Valley railroad. The petition of the National Tube Co. applies to its pipe manufacturing plant in McKeesport, Pa., on the McKeesport Connecting railroad, and the one for the American Sheet & Tin Plate Co. is for its tin plate mill in Elwood, Ind., on the Elwood, Anderson & LaPelle railroad.

Corporation's Position

Steel Corporation interests take the position that all of these cancellation tariffs merely add to the freight rates paid by shippers and receivers for the cost of performing terminal transportation services despite the fact that the expense of these services is included in the through rates. It is also pointed out that millions of dollars are invested in their industries on these so-called industrial railroads, as well as in the instrumentalities of transportation themselves. Among other claims made is that the United States Supreme court has held that these lines should be operated under through rates of freight as they are construed in this country.

Enforcement of the commission order, it is contended, would mean the loss of millions of dollars of revenue to certain line carriers in the Pittsburgh district which have not adequate terminal facilities or any physical means of acquiring any such facilities to transport the traffic. The petitions cover the elimination of allowances for transportation services performed for line carriers and the expense of the manufacturing companies' services, it is maintained, is included in the abnormally high rates on steel products and raw materials.

The petitions were filed by Attorney Charles S. Belsterling, one of four lawyers representing counsel. The others are Charles MacVeagh, J. H. Reed, and C. A. Severance.

Spotting Tariffs

Washington, March 24.—Opportunities for undue discriminations are declared to be afforded by spotting tariffs proposing a charge of 5½c per ton with a minimum of $2 per car, which have been filed with the Interstate Commerce Commission. The first straight spotting tariff, which provides such a charge, was that of the Chesapeake & Ohio railway for spotting on the tracks of the Virginia Portland railway at Fordwick, Va. Filed March 18, it will become effective April 18, unless suspension is ordered by the Commission and this is considered improbable. Indications are that spotting tariffs of the character of those filed will be the object of attack, and it seems evident that the railroads themselves will not be satisfied with the provisions incorporated.

The C. & O. tariff, for instance, says that a "spotting service" is "the service beyond a reasonable, convenient point of interchange between the Chesapeake & Ohio Railway Co., and the Virginia Portland railway's tracks". The nearest approach of a definition by the Commission as to what constitutes "a reasonable, convenient point of interchange", was a statement in the original tap line case that "No allowance, however, ought to be made by a trunk line to a lumber company, where the mill is within, say, 1,000 feet of the trunk line". The vagueness of the provision is so patent, it is contended, that large powers of undue discrimination could be exercised.

Explaining what the spotting service shall include, the C. & O. tariff says: (a) One placement of a loaded car which this company has transported, or (b) The taking out of a loaded car from a particular location on the Virginia Portland railway for transportation by this company". Included in the charges is the handling of the empty car in the reverse direction. The minimum charge provision is also held to be provocative of unjust discrimination. It is pointed out that this charge would be made for spotting a car at points, say, three or 12 miles distant from the terminal point. This, it is pointed out, is an unfair discrimination against the point only three miles distant.

The plant of the Western Cartridge Co., East Alton, Ill., March 22, suffered $36,400 loss by fire.

Crushing Plant for Furnace Flux

Description of new limestone crushing works which furnish flux to Illinois Steel Co.

By C A Tupper

TO KEEP down the cost of producing pig iron it has been necessary for operators to analyze closely the numerous elements entering into the problem. Of these, the group represented by the burden itself is naturally the most important. But while the mining and transportation of iron ore and the manufacture and delivery of coke have long been given careful attention, the matter of material for fluxing has, until recently, had far less consideration.

In the last analysis, the outlay for flux must, of course, be taken as its net cost laid down in the furnace charge, but back of that cost are the constituent factors of the latter, not least of which is the expense of quarrying and crushing.

Systematic Study of Crushing Machinery

Only within a comparatively recent period has any systematic study been made of crushing machinery in its relation to different materials and varying conditions of plant operation. The type of apparatus selected, whether jaw breaker, gyratory crusher or rolls, formerly depended more upon individual preferences, availability, cheapness or local custom, than upon any logical determination of the character of the machine best adapted to the service. Now, however, a new spirit prevails. Iron and steel companies that crush their own flux or quarry owners supplying it are no longer content to take whatever offers in the shape of crushers that "will stand up to the work" and can be purchased on the most favorable terms. The words "efficiency" and "economy" have come to have new meaning, to stand for dollars and cents of possible gain, of saving that can be definitely figured.

A noteworthy example of progress in this direction, where the design and layout of buildings, machinery, etc., have been carefully studied with reference to the exact nature of the work in hand is to be found in a new plant at Fairmount, Ill., where the crushing of flux is done on a larger scale than at any other place in the world. This plant is operated principally to supply the furnaces of the Illinois Steel Co., at Joliet and South Chicago, Ill., and of the Indiana Steel Co., at Gary, Ind. The deposit worked consists of a high grade calcite especially adapted to fluxing.

The quarry was opened in 1898 to supply material to the first of the furnaces named. As originally laid out, the equipment consisted of a No. 6 Gates breaker, which, owing to the greater capacity demanded, was soon afterwards replaced by a No. 7½ machine of the same type. The latter continued in service until 1904, when a new plant, including a No. 9 Gates breaker of improved type, was substituted. This was operated continuously until the present plant was built and is believed by authorities to have crushed not only more flux but more stone of any kind than any crusher in the world, having been operated for a great part of the time both day and night. The No. 9 plant was equipped with hoists, continuous bucket elevator, screens, etc., such as are commonly installed for services which are similar in character. The new plant has been designed with a view to securing the highest efficiency which it is practicable at this time to attain, not only in the crushing operations, but also in enabling larger blocks to be handled in the quarry and operating expenses there correspondingly reduced.

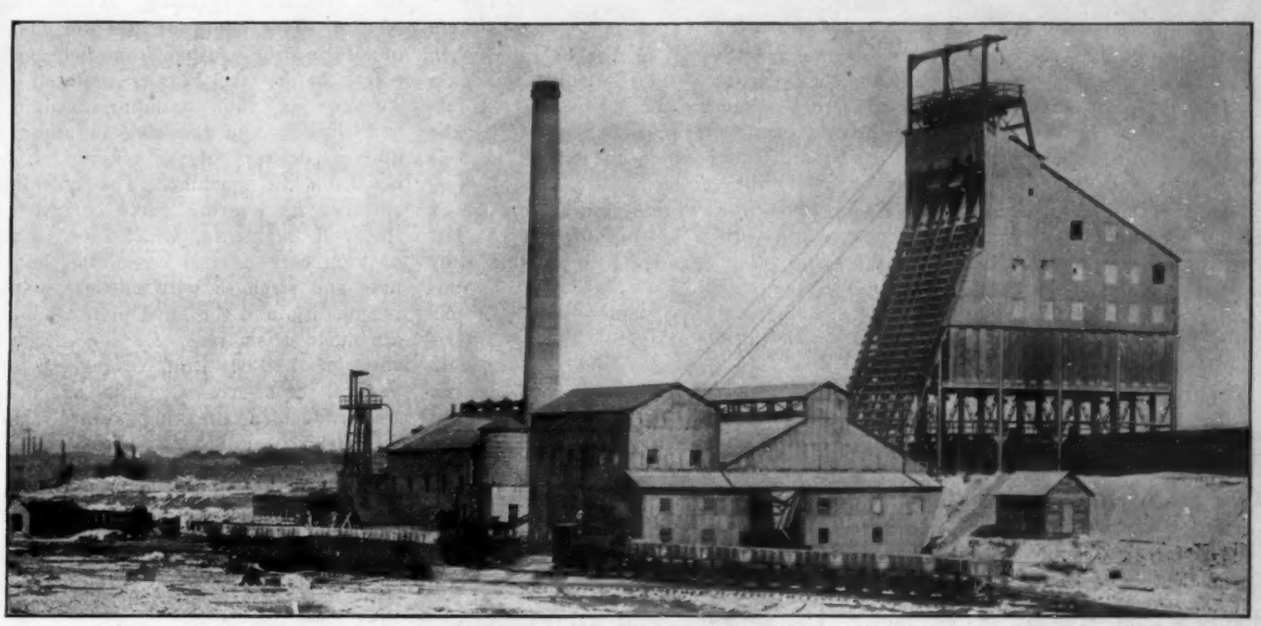


FIG. 1—GENERAL VIEW OF THE ILLINOIS STEEL CO.'S LIMESTONE CRUSHING PLANT AT FAIRMOUNT, ILL.

The Deposit

The calcite bed has a thickness averaging only 20 feet and it is covered with about 12 feet of earth. Stripping is done with steam shovels. The unusual size of the overburden as compared with the thickness of the deposit makes it especially important to reduce costs at this point and

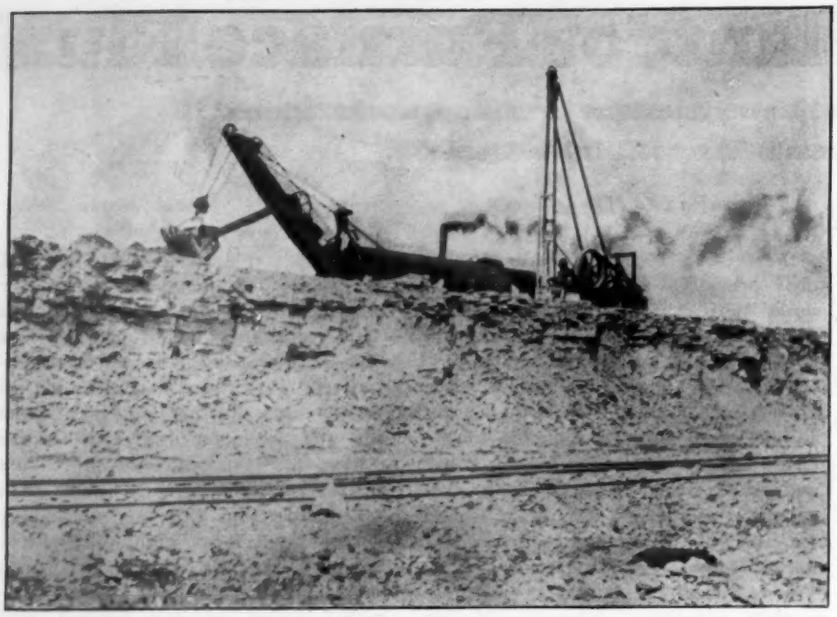


FIG. 2—STEAM SHOVEL AND WELL DRILLING MACHINE IN QUARRY

everything possible has been done to that end. The shovels used are of the Marion type, ranging in size from 60 to 100 tons. All strippings are dumped back into that part of the quarry from which the stone has been taken, the material being hauled away for this purpose in 6-yard side dump cars of the Kilbourn-Jacobs type. Vulcan locomotives are used for pulling the trains. In drilling operations the well-type of drill is used. For firing, the electric method, in single trains, has been applied.

The stone, as broken up, is loaded with steam shovels. It is occasionally necessary to reduce large pieces of rock by "dobeying". During the cold weather it is found difficult by ordinary means to prevent dynamite from freezing, and W. O. Taylor, vice president and general manager of the company operating the quarry, conceived the idea of making a dynamite carrier on the principle of the thermos bottle. With each of these he succeeded in keeping the dynamite 24 hours without freezing, even when the weather got down to many degrees below zero.

The stone is loaded in 9-yard side dump cars, eight to ten of which are coupled in a train and hauled distances varying from 200 to 1,800 yards to the new crushing plant. For motive power, 35-ton Vulcan locomotives are used. The haul is approximately on grade. At the crushing plant the arrangements have been so made that the cars can come in from either direction or can be run through the plant.

Two crushing units are now installed and the foundations for a third have been put in place, the centers being 16¼ feet, or the overall length of each car. This enables two cars to be dumped simultaneously at present, and three can be handled at the same time when the third unit is ready for service.

The rock first passes through a chute with a bottom formed of grizzlies, each 3 and 2½ by 10 inches by 8 feet. The rock is fed from this chute to the hoppers of two 36 x 60-inch Fairmount type crushers and reduced to 8 inches and smaller, falling from each crusher to a rectangular bin which has a capacity of 16 tons.

In each of the crushers mentioned, which are of a new roll type used for the first time at this installation, the rock is reduced by a continuous feeding and crushing action from sledging blows delivered by the projections on the roll pounding the rock, which is held against an anvil block. These continuous crushing blows produce a gripping action upon the smaller pieces of rock in the charge delivered to the machine, crushing them by pressure with a clean, sharp break. Each piece drops lower on the anvil block following each blow until it leaves the machine. After the smaller pieces in the charge of rock delivered to the crusher have been crushed and passed through the machine, the large pieces, which are automatically rejected until the last, are subjected to the sledging blows from the roll projections and constantly turned to present new surfaces for these blows until they are broken into sizes small enough for the gripping, crushing action described. This operation has the effect of clearing the crusher from the small pieces before the heavier material is worked up, thus avoiding wedging and choking and resulting in a more uniform delivery of the crushed product from the machine. The crushing surfaces or wearing parts consist of the roll segments, which are made of high carbon steel combining hardness and strength with unusual wearing quality, and the anvil plates, which are made in sections of a special mixture of chilled iron corrugated in vertical cross-section. The effect is to produce a breaking rather than a crushing action.

The main frame of each crusher is

FIG. 3—STRIPPED GROUND AT QUARRY

made of two cast iron girder beams, heavy box section, upon which are mounted the bearings of the roll shaft, the pivot bearings of the anvil block and the countershaft bearings. The tensile strain due to crushing is taken by two upper tension rods, which tie the pivot on the anvil block to the main bearing of the roll shaft, and by four diagonal spring tension rods which tie this bearing to the lower end of the anvil block. The roll shaft is also provided with two nests of heavy springs, so that the anvil block may be forced away from the roll in order to pass a piece of steel or other unfriable material which may accidentally get into the crusher. Other features in the construction of the machine are of considerable interest, as indicating the character of the service rendered, but these will not be discussed.

The large crushing capacity of the plant opened up a new problem in handling its product from the crushers to the loading bins. This was solved by the use of skips in an original and economical manner.

Operation of the Skips

The 16-ton bins below the crushers open towards a skipway inclined away from the crushers at an angle of 22½ degrees from the vertical, and for each unit there are two skips working in balance. Each skip, in its descent to the loading position, engages a latch on the bin gate, causing it to open downward. The gate, however, is so proportioned that no stone is discharged into the skip until the latter has reached its proper loading position. The bin gate is held open by the weight of the skip until there has been discharged into it from the bin the normal load of 8 tons of crushed stone. While at the bottom the skip rests on a shock-absorbing, resilient platform, supported by springs, which gives the skip an upward impulse at starting, thus aiding the hoist motor.

The plant is so designed that the latch arranged to hold the bin gate can either be automatically tripped by raising the counterweight attached to the spring platform or the latch can be released by hand through pulling on a rope.

As the descending skip nears the bottom of its travel, the loaded skip of course also approaches the top of its travel, and both skips are simultaneously stopped. The arresting of the hoist which operates the two skips is effected by means of a standard traveling limit switch connected to the drum shaft of each hoist and so designed that near the end of the travel the proper amount of resistance is exerted to slow down the motor, while at a predetermined position the solenoid-operated main line switches are opened by breaking the circuit through the limit switch. This switch has as its principal moving element a nut traveling in guides, the nut being directed in its travel by the rotation of a screw. That screw, turning in opposite directions with the reversals of the hoist, causes the nut to travel in opposite directions, thereby stopping the skips at each of the limits of travel set for them. When the skip at the bottom of the incline has received its proper load of stone from the bin, the latch holding the bin gate open is tripped, allowing the gate to be closed by its counterweight. During the last movement of the bin gate, just before closing, a clip on the cable of the counterweight engages with an electric switch and starts the hoist. After the skip has reached the limit of its travel, the hoist is stopped by the traveling limit switch and the former operation is repeated for the other skip of the pair as soon as it has been filled with stone.

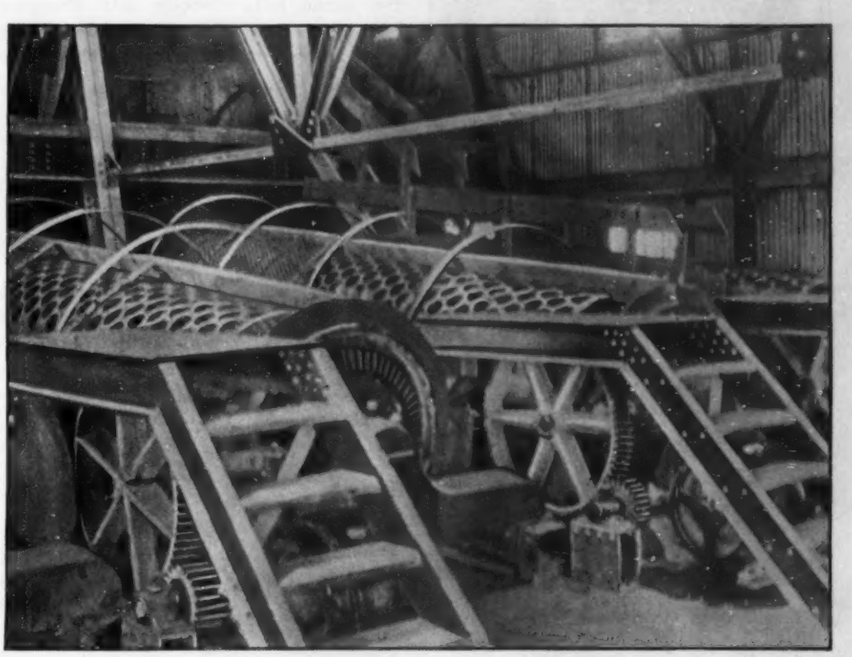


FIG. 4—THE SIZING TROMMELS

There is one hoist and a pair of skips for each crusher. Each hoist is driven by a 125-horsepower, 3-phase, 60-cycle, 550-volt induction motor. The motor is geared to the hoist and fitted with a solenoid brake. The motor runs at 560 feet per minute and the hoist has a rope speed of 200 feet per minute, equivalent to about 13 revolutions per minute for the drum shaft.

The starting of the hoist motor is effected when the special electric switch above the bin gate is actuated by the closing of the gate, thereby making the connections of a secondary circuit which energizes the solenoids of the reversing switches on the main line supplying the hoist. As these switches close, current is admitted to the motor and at the same time the solenoid attached to the brake is energized, thereby releasing the brake. The hoist motor is of the wound rotor type, with slip rings and variable external resistance. The closing of the contactors which cut out resistance is at first prevented by the heavy rush of current acting on a series relay. As the motor accelerates and the current value decreases, each step of resistance is automatically cut out, there being five steps in all. As the nut on the limit switch approaches one end of its travel, it first opens a secondary contact which causes all the resistance switches to open, thereby throwing full resistance into the circuit of the rotor of the hoist motor. In the actual operation of the plant, it is found advisable to have this switch open when the rising skip is about 10 feet below its dumping position. Due to the resistance inserted in the rotor circuit, the hoist slows down and is stopped at a predetermined position by the opening of a second switch, which forms a finger contact. One switch for throwing in resistance and one switch for stopping the hoist are provided at each end of the travel of the nut. The control switches at both ends are closed except when the nut is in its final position at one end or the

other. Current, however, can only be admitted to one side of the main line reversing switches through the special control reversing switch which is operated by the closing of the bin gate.

At the top of the skipway the

FIG. 5—SKIPS ON FOUR-TRACK HOISTING INCLINE ENTERING DUMP

crushed stone is discharged to bins with an aggregate capacity of 120 tons. From these it is fed through automatic feeders to four 4 x 20-foot revolving screens, inclined 1½ inches to the foot, which separate the material into 1½-inch, 5-inch and oversize, or 8-inch products. The material from 1½ to 5 inches is that used for flux in the blast furnaces, while the oversize between 5 and 8 inches goes to the open-hearth furnaces. All under 1½ inches, together with some of the oversize which is recrushed at the kilns, is taken by the Universal Portland Cement Co. for its Buffington, Ind., plant. At certain seasons of the year, the dust must be screened out from the finer product to prevent the material from freezing together in the cars.

The Shipping Bins

From the revolving trommel screens the stone falls directly into shipping bins for the different sizes. These bins are of the box type, the stone forming its own hopper. The bin gates are of the radial opening pattern, made exceptionally large and heavy on account of the size of the product to be discharged. Cars are run underneath the bins on four tracks, with a fifth track as a run-around for bringing in empties.

The power plant is of thoroughly modern design, its equipment including water tube boilers and a steam turbine generating unit. The crushers are each driven from a 125-horsepower motor, and all of the auxiliary machinery is electrically-operated.

The designs and machinery were furnished by the Allis-Chalmers Mfg. Co., through H. Schifflin and R. C. Newhouse, manager and engineer of the crushing machinery department, while the entire plant was laid out, erected and started under the supervision of K. E. Casparis, assistant general manager of the Casparis Stone Co., operating the plant. To the latter the writer is indebted for the

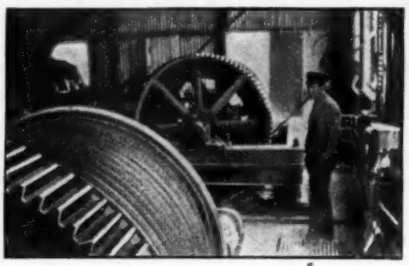


FIG. 6—MOTOR-DRIVEN HOISTS

greater part of the information contained in this article. The building frames are of structural steel designed and furnished by the Illinois Steel Co.

Since the plant was started, three others of similar design have been placed in operation or are under construction to furnish flux for large steel companies in the Pittsburgh district.

Treating Ingots With Aluminum

Aluminum added to the molds while pouring the steel, has a solidifying influence on Bessemer ingots. The piping in the ingot head is larger but the steel around the pipes is denser and the small elongated holes usually found along the sides of the untreated ingot are absent.

These interesting conclusions are made by M. H. Wickhorst, engineer of tests of the rail committee of the American Railway Engineering Association, in a report to that organization. An investigation was made to determine the influence of aluminum on Bessemer ingots and rails and the influence of silicon on Bessemer rails when added as ferro-silicon to the molds.

The tests were conducted at the South Chicago, Ill., works of the Illinois Steel Co., which concern furnished all materials and facilities. Four ingots were split open and a chemical survey made. The other 11 ingots were rolled into 85 or 90-pound rails and used for drop tests and transverse tests of the base. Five ingots were of untreated Bessemer steel, eight were treated with aluminum varying from one to ten ounces per ton of steel and two ingots were treated with additions of ferro-silicon equivalent to 0.1 per cent and 0.2 per cent of silicon respectively. These latter were rolled into rails.

The ingots used for splitting and chemical survey had about 0.44 per cent carbon. The plain ingot had a large central cavity or pipe in the head and a large number of the small holes along the sides in the upper part. This ingot also had a raised top. The other three ingots treated respectively with one, two and five ounces of aluminum per ton of steel, had somewhat larger pipes but were free from the holes on the sides. They had flat or sunken tops.

A chemical survey was made of each of the ingots by means of 15 samples from each of five vertical rows from one-half of the section face, making a total of 75 samples from the ingot, minus the samples which could not be taken on account of cavities. On each sample determinations were made of carbon, phosphorus and sulphur and on some of them, of manganese and silicon also.

The surveys showed a more even distribution of the material in the aluminum-treated ingots. The treated ingots showed less segregation or concentration of carbon, phosphorus and sulphur in the interior and upper part of the ingot. Both plain and treated ingots showed "soft centers" in the lower part of the ingot, that is, there was a negative segregation of carbon, phosphorus and sulphur in the interior and lower part of the ingot. The walls of the treated ingots showed a fairly uniform composition throughout their heights. The plain ingot showed a considerable softening or negative segregation in the upper corners. The carbon, phosphorus and sulphur increased in the wall downward of the ingot until the average

(*Continued on page* 610*c*)

Niles Boring Mill

Niles-Bement-Pond Co., New York, has recently developed a new line of boring and turning mills ranging up to 73 inches in size. These machines differ materially from those which have been built by this company heretofore. All of the control levers are placed within reach of the operator's position. The movement of a single lever engages or disengages the fine or coarse feed and operates the fast traverse in either direction. The hand adjustment of the saddles and boring bars is accomplished by automatically releasing ratchets located at the sides of the saddles.

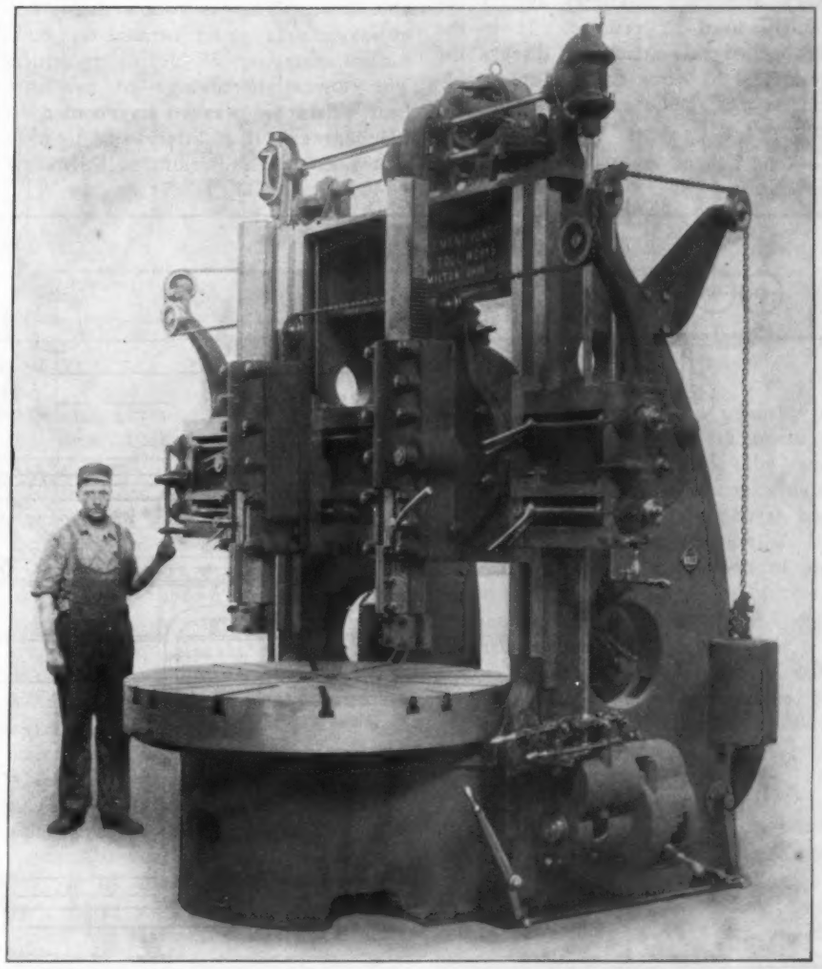
No part of the machine extends below the floor line and no special foundation is required. The housings are of box girder form with broad faces, double webbed. There are no openings in the front of the face, the cross-rail elevating screws being located between the housings. The latter are securely bolted to the bed and are firmly tied together at the top by a heavy brace. The heavily ribbed table is supported on an annular bearing of large diameter which runs in a bath of oil. The surface of the table has four pairs of parallel and eight radial T-slots. The table is driven by an accurately cut, coarse pitch bevel gear. The table spindle is kept in alignment by bearings at each end. The upper spindle bearing is bored out of the bed and fitted with an adjustable taper bushing, which takes up the wear. The lower end of the spindle is fitted with an adjustable threaded collar.

The cross-rail is of the three-track type with a narrow guide at the bottom. The saddle traverse screw is located between the guiding surfaces and the cross-rail itself has sufficient depth to effectually resist heavy cutting stresses. The wear in the saddle bearings on the cross-rail is taken up by means of tapered gibs. Each saddle may be bolted rigidly to the cross rail when the bar is feeding.

Each cutter head is provided with eight, continuous reversible feeds. The boring bars are suitably counterweighted and the tool holders have straight shanks. Safety friction clutches located on the vertical spline shafts insure against accident in case the heads or bars meet with an obstacle either when feeding or fast traversing. The machine is designed either for direct or alternating current motor or belt drive. The motor is mounted on a drive plate in the rear between the housings and the power is transmitted through a double run of clutch gears giving two mechanical changes in speed. The direct current motors with which the machines are fitted have 16 speeds, thus giving 32 speeds to the table. These motors are fitted with push-button control and the table is equipped with a dynamic brake. A separate motor located on the top brace is used for elevating the cross-rail and providing the rapid power traverse for the bars and saddles. The principal dimensions of the various machines of this type now being manufactured are given in the accompanying table.

DIMENSIONS OF BORING MILLS.

Rating size, inches	Actual swing, inches,	Maximum height under tool holders, inches,	Maximum height under cross-rail inches.	Bar travel, inches,	Diam. of table, inches.	Horsepower of motor.
44	44½	30	36	20	42	7½ and 1½
53	54	36	42	24	52	10 and 2
62	63	40	46	30	60	10 and 2
73	74½	40	46	30	68	12½ and 2



NILES MOTOR-DRIVEN BORING MILL.

"The Red Iron Ores of Eastern Tennessee" is the subject of a 173-page bulletin issued by the Tennesee State Geological Survey and compiled by Ernest F. Burchard, geologist, of the United States Geological Survey. This bulletin describes the red iron ores of what has been termed the Chattanooga district and directs attention to the importance of the southern iron ore fields. A number of valuable maps are included and several southern blast furnace plants are illustrated.

How to Clean Blast Furnace Gas

A discussion of the methods employed at the Duquesne plant of the Carnegie Steel Co.

By A N Diehl

THE conservation and use of blast furnace gas dates back to the earlier history of pig iron manufacture. Before this period all the gas was wasted, but the advent of the hot blast stove and steam blowing engines brought a demand for additional fuel, and the natural source of this was waste gas at the tunnel heads. The gas issues from the top at a velocity varying with the volume of air blown and the size of the tops and outlets, and its temperature is usually from 300 to 400 degrees Fahr. Its constitution also varies with the fuel practice of the furnace. The problem of handling the gas would be a comparatively easy one if the gas leaving the furnace did not carry along mechanically a considerable quantity of what is known as flue dust, as well as a material which afterward sublimes and is extremely hard to remove. It is the purpose of this article to discuss the method of handling the flue dust problem at the Duquesne works of the Carnegie Steel Co. The amount of moisture in the raw gas varies with the water in the stock. The use of Mesabi ore has made the addition of water a necessity in most hard-driven furnaces in order to prevent dust being blown over, and this water, of course, is evaporated and carried by the gas. Per pound of dry fuel gas consumed, clean gas with moisture saturated at 70 degrees Fahr. gives an available heat of 79.51 per cent if the products of combustion are cooled to 600 degrees Fahr. Raw gas at 400 degrees and 35 grains moisture has an available heat of 77.03 per cent. Partly washed and cooled gas at 125 degrees gives an available heat supply of 74.33 per cent. From a calculated thermal standpoint, we conclude that washed gas cooled to 70 degrees Fahr. gives the largest percentage of available heat. This is followed by hot unwashed gas under furnace-top conditions carrying 35 grains moisture. The lowest percentage of available heat exists for washed gas cooled to 125 degrees. It is interesting to note that thermal equilibrium between raw unwashed gas and washed gas, approximates a temperature midway between 70 and 125 degrees.

The solids contained in the gas consist of the mechanically carried particles of varying degrees of fineness and a volatile substance which is carried as a gas and finally deposited, or which may pass through the entire system. The gas from the furnace should deposit the heavier material of the flue dust in the dust catcher and pockets, and only the lighter material should pass to the scrubbers. In order to determine if this is true, we took samples of the dust from the dust catcher at the Duquesne plant and also samples of the sludges from the settling basins. We first endeavored to sieve the material, after drying, but with no success, and then washed it through screens, weighing that which remained. The screens ran up to 300-mesh, and the tests show that 92 to 95 per cent of the sludge from the basin passed through the 300-mesh screen. This material is also the richest in metallic yield, showing 41 per cent iron. It is noticeable that only about 18 per cent

Presented at the February meeting of the American Institute of Mining Engineers.

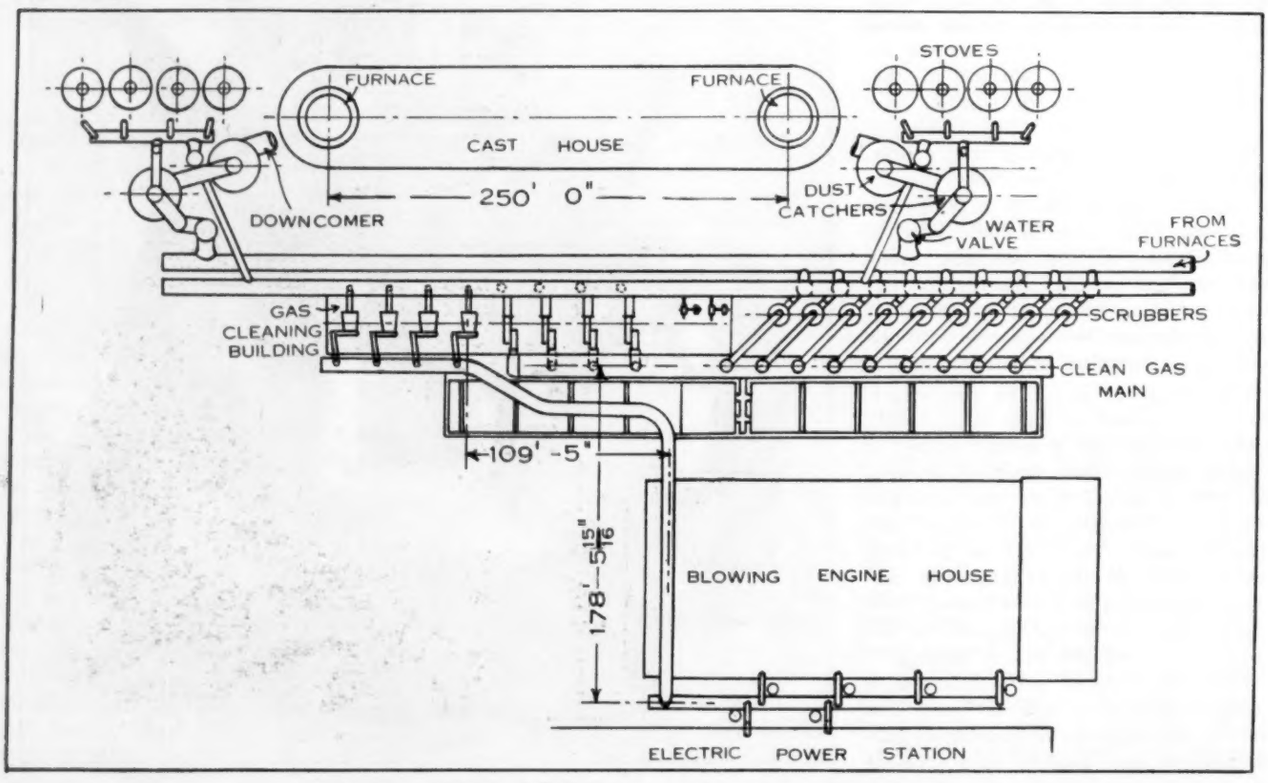


FIG. 1—GENERAL ARRANGEMENT OF GAS CLEANING PLANT

of the fine dust remained in the dust catcher. This may have been carried down in contact with larger particles; that is, the fine particles would stick on the larger ones, but would be separated by water. Very interesting data would be revealed if ore were wet sieved instead of dry sieved; a more uniform and more accurate representation of the actual physical condition would then be had. An ore which we sieved dry ran 9 per cent through 100-mesh, and the same sample ran 24 per cent through 100-mesh when wet sieved.

Bearing in mind the finely divided condition of the dust, as shown in the sieve tests, it will be interesting to note the rate of settling of this material. We have a double settling basin. The water passes from the collecting sewer beneath the scrubbers and flows into one section, filling it with dirt. The dirty water is then diverted to the other section, and the first cleaned by means of a grab bucket, the material being loaded into cars. There are six partitions, or baffles, which tend to hold back the dirt and aid in settling it. Each division of the basin is 161 feet long and 26 feet wide, the water flowing over a weir at the end. The capacity is 500 tons of wet dirt. Each side of the settling basin holds 197,920 gallons of water when clear of dirt. The dirty water was allowed to flow through for a day; then, from a platform erected over the first compartment, samples were taken at various depths. A brass tube fitted with a rubber stopper and a rod was used to obtain the samples. The closed tube was lowered to the desired depth, the bottom opened and the water allowed to flow in. The stopper was then drawn into place and the samples put in a jar for weighing and measuring.

The sludge in the settling basin is of the consistency of a thick jelly and filters with almost the same rapidity. In this condition it is extremely difficult to handle. We allow the basin to drain as much as possible, then remove the sludge with a grab bucket, and load into cars. These cars must be calked water tight to hold the material. If the material would drain easily most of the trouble would be obviated, and tests were made to locate the difficulty. A flume was first constructed to carry the water from one scrubber and with sufficient fall to create fairly rapid flow. Constrictions were built in the flume so as to speed up the water at different points to carry the lighter material forward. By this scheme we succeeded in making a rough separation, and obtained a fine but granular product from which the water drained easily. The trough was widened out somewhat at the end and the speed of flow decreased. This gave us the same product we had to deal with in the basins, as a lot of fine material was deposited. In order to determine a settling standard for comparison, we took some Group-3 ore, a standard Mesabi, and wet sieved it through the various screens up to 300-mesh. These different screenings were put into similar bottles filled with water and shaken up. The material which passed through the 200-mesh sieve took 14 seconds to settle; that which passed through the 300-mesh required several hours. A scum of fine, light material, principally coke dust, extremely gelatinous, forms on top of the basins and afterward sinks. Mixing a small quantity of this material with the coarse dirt which previously filtered freely, at once prevents all filtration. It is reasonable to suppose that a lot of the dirt could easily be handled if this slime were eliminated. We are at present experimenting with various means to make this separation and expect to do away with many of the difficulties in handling this material and also recover a good product for sintering or charging back.

An attempt was made to arrive at a correct figure for dirt in the gas entering the scrubbers, and it was decided that 500 cubic centimeter samples of water should be taken at intervals from the overflow water of the scrubber and collected in a carboy. The water was afterward filtered. In this manner and over a period of 19 days, samples consisting of 2,000 pounds each were taken. From weir readings on the settling-basin over-

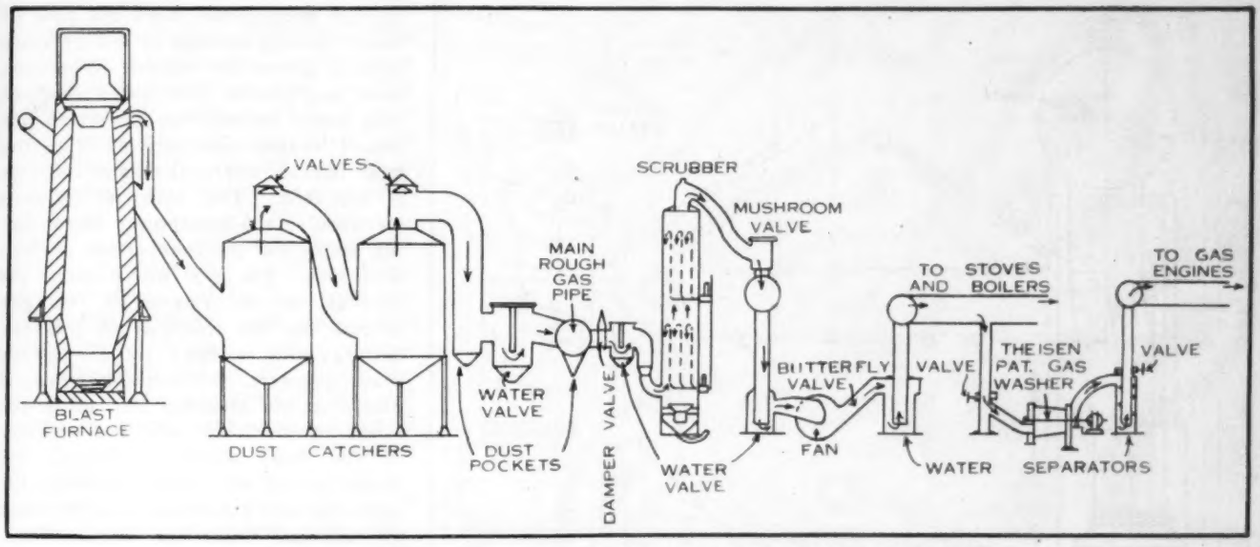


FIG. 2—COURSE OF THE GAS THROUGH THE CLEANING PROCESS

flow, we determined the quantity of water for the period, and by means of recording meters and Pitot-tube readings we determined the gas volume passing through the scrubbers, and, therefore, determined the actual dirt represented in 6,240 cubic feet of gas, which was 2.6 grains per cubic foot. The sampling was done under normal operating conditions.

This dust consists of ore, coke dust and limestone dust, beside organic acids and compounds which seem to condense and are composed principally of silica and alumina. The gas may be of a dense white nature, or of a reddish hue, due to the predominance of fume in the former case, and ore dust in the latter case. The former is the harder to remove, and almost invariably if the dirt on the filter capsule in the testing apparatus is light in color, the gas is dirtier

than if red. Gas after final cleaning still retains some of the whitish fume. This material is deposited in the bottom of the stoves, in the stacks, and on the boiler settings. In places where the gas has only been rough cleaned the color is a pinkish white, without grit and with a feeling similar to talcum powder. The stacks at all times show this white fume, and a determination was made to see how much of the dust left in the gas at the scrubbers passed through the entire system without depositing. It indicated that 27.5 per cent of the dirt shown in the scrubber analysis passes through the entire system.

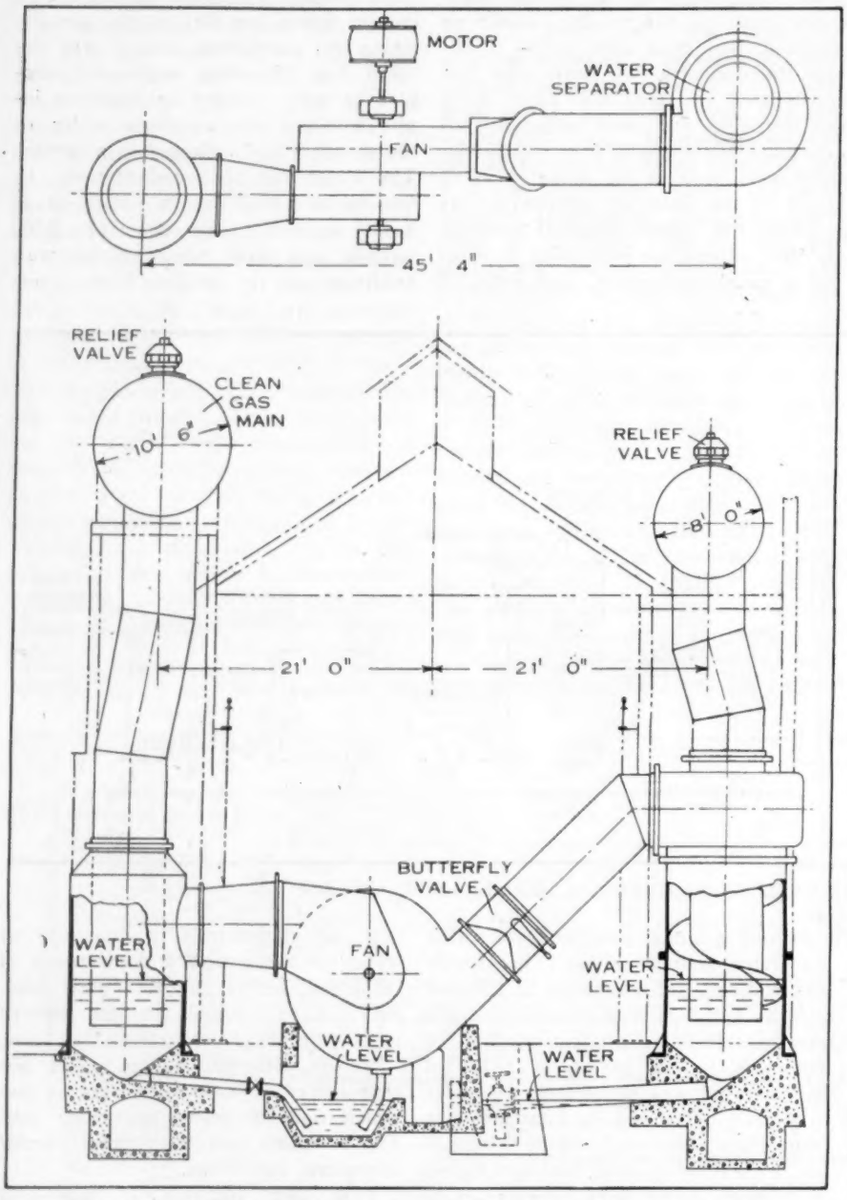


FIG. 3—SECTION THROUGH THEISENS, SEALS AND SEPARATORS

The system of cleaning gas at the Duquesne blast furnaces consists at present of scrubbers, fans and Theisen washers. This installation was first designed for the purpose of cleaning gas for six 3,600-horsepower gas engines, four sets of stoves and 1,500 boiler horsepower. At the time of its installation it was the largest in the country and very little reliable data could then be collected on the subject. Nine towers, four fans and four Theisen washers were erected. After operating a while, numerous changes became necessary. We found that four scrubbers, two fans and two Theisens were sufficient for the demands. The plant is shown in the illustrations as at present.

We first started with scrubbers having a rotating nozzle at the top, the water to form a rain and thus come in contact with the gas and clean as well as cool it in this manner. The gas channeled under these conditions; the pressure over the scrubber area was constant, but the ascending gas column, due to velocity head, deflected the water. This was shown clearly by repeated tests, using a pipe with a funnel on one end and a standard pail outside, the time required to fill the bucket being taken. After the bucket was full, the pipe was withdrawn 4 inches and the filling timed once more. In this way we tested across the scrubber. Distinct dry areas were found, irrespective of all possible regulation of water and gas deflecting apparatus.

It was then decided to reverse the scheme of having gas the dominating element and put in the water in such manner as to change the direction of the gas in its upward course and at the same time spray it repeatedly. This was done by injecting the water through a valve having a number of openings and a core moving therein. This core successively blocks off the openings to the different nozzles, and thereby temporarily stops the flow of water, causing an area of low pressure directly above the nozzle. When the core has passed, the water resumes and sprays through the gas which has flowed to this point, driving it to the next nozzle, where the same process is repeated. The core is revolved electrically, a 5-horsepower motor being ample for the four valves on two scrubbers. The gas rises through the scrubber at the rate of 4 feet per second and the water at 60 feet per second with a head of 35 pounds main pressure. A second valve is placed in the scrubber just above the range of the lower one and operates in the same manner. Screens are placed above the nozzle to break the water up into fine drops so as to bring the gas and water into intimate contact. It is evident that the gas will be repeatedly sprayed as it travels in an upward spiral course until it has passed the range of the water. Fifteen revolutions per minute is found to be about the right speed for the core. Fig. 4 is a section through the scrubbers.

The gas is cooled down very effectually, numerous readings showing only 5 to 6 degrees above the temperature of the ingoing water. An average moisture test shows 0.5 grain above the saturation point at the temperature of the outgoing gas. These tests were taken on the outlet pipe of the scrubbers and were made with the Brady apparatus and also with the Brown apparatus. The difference in temperature between the gas and water can be increased or decreased, depending on the quantity of gas passing through the scrubbers. We have found that between 25,000 and 30,000 cubic feet can be passed through

our 12-foot scrubbers. The moisture content of the gas increases very rapidly above 90 degrees Fahr. and we aim to keep under this as much as possible. The moisture, if not controlled within limits, will lower the stove efficiency to such an extent as to make cleaning prohibitive.

Measurement of Water

The water is taken from the service mains and is charged at the regular water rate. This condition is different in plants where waste water is used. The Duquesne plant construction is such as to deliver our bosh cooling water to mill condensers and water-purification plants. About 815 gallons of water are used per minute per scrubber. All water flows over a weir, so that the quantities are accurately determined, readings being taken four times a day. The electric power is metered, and the quantity of gas delivered to the engines is determined by Venturi recording instruments. The stove gas is determined by Pitot-tube readings, hydro-determinator and Ellison gage, all results checking closely. The water used in gas valves and seals flows to the settling basins and is, therefore, recorded in the weir readings.

The fans are of Sturtevant type, electrically driven by direct and alternating current motors; each one has a capacity of 84,000 cubic feet of gas per minute. A water seal is placed on either side to provide means for repairing. The seal after the fan also forms a spiral separator for water which may be picked up in the fan. A calked main serves to connect the scrubbers with the fans and is 10 feet, 6 inches in diameter. After leaving the fans, the gas is carried into an 8-foot primary gas main and distributed.

Theisen Washers

The Theisens are four in number, three being driven by alternating and one by direct current motors. The motors are each 150 horsepower and drive the rotor 375 revolutions per minute. Each Theisen has a capacity of 15,000 cubic feet of gas per minute. There are seals and separators on the Theisens the same as on the fans.

The gas from six blast furnaces is allowed to go into a general dirty-gas main, 8 feet, 6 inches in diameter, and is distributed to the boiler houses, both sets of stoves and gas-cleaning plants. A pressure of 12 inches of water is maintained in this main. The gas for the gas cleaning plant goes through water valves to the scrubbers which are in parallel, and thence to the 10-foot, 6-inch collecting main, from which it goes through the fans to the primary or scrubbed-gas main and is distributed to No. 3 boiler house extension to stoves on Nos. 3, 4, 5 and 6 furnaces, and to the Theisens. The pressure in the receiving main is 10½ inches and in the primary main 8 inches. The Theisens boost the pressure to 12 inches and deliver the gas to the engines. These pressures relate to operation without fans, the gas being propelled by the pressure of the furnace. We operated for a period of a year and a half this way, but are using fans now, due to a desire to lower the top pressure, saving gas losses, and lessening the dangers during tuyere changing, etc., when a high gas-main pressure causes trouble. We desire a pressure of 5 to 6 inches at the stove burners, for the reason that our distributing mains are too small and we have poor stove draft. The friction through the various fan seals, and through the fans, also made it necessary to back up the gas. In a new installation many of these difficulties would be obviated. Formerly we removed no dirt in the fans, but we have so altered them lately as to reduce the dirt content from 0.2 to 0.06 grain per cubic foot. The Theisen washers, as shown in the gas test for 1912, lower the dirt content to 0.009 grain per cubic foot.

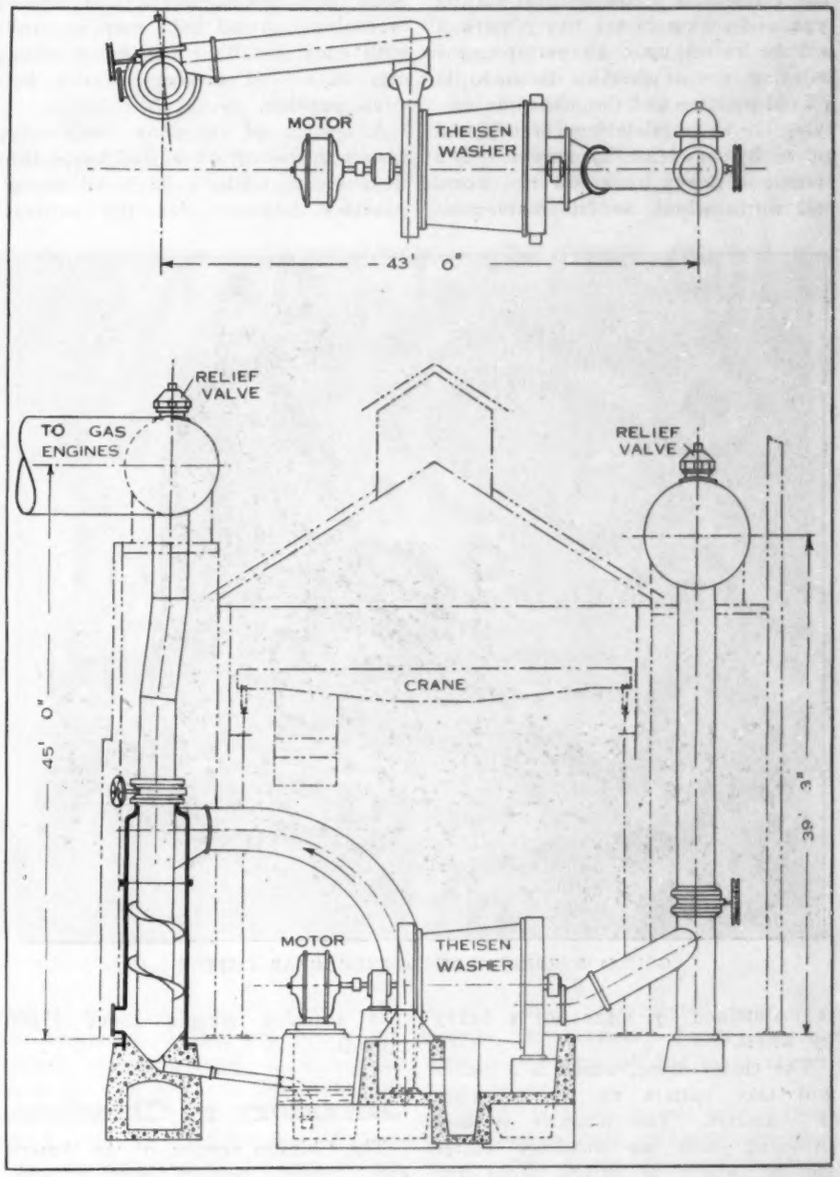
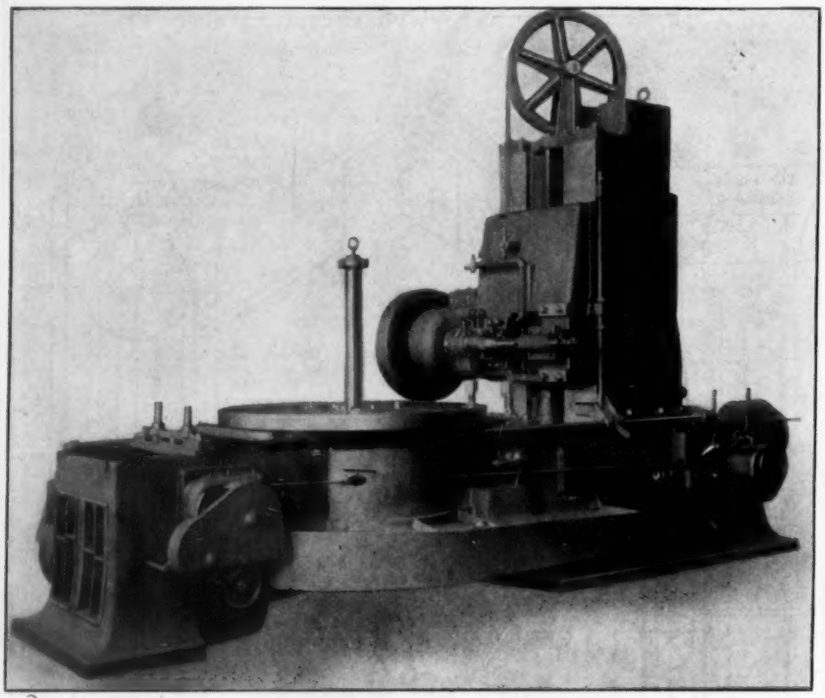


FIG. 4—SECTION THROUGH SCRUBBERS SHOWING APPARATUS FOR PRIMARY CLEANING

The Wabash railroad car shops, Moberly, Mo., were seriously damaged by fire recently, the loss being estimated at $100,000, including a number of passenger coaches that were in the shops.

Large Gear Cutter

For Foote Bros. Gear & Machine Co., Chicago, Gould & Eberhardt, Newark, N. J. have recently completed one of the largest gear cutting machines they have ever built. It is designed to cut spur gears up to 144 inches in diameter with a 24-inch face and has capacity for cutting steel gears up to 4 inches circular pitch. The machine is of the vertical cutting type, and owing to the heavy work it will be called upon to perform, the indexing worm wheel is mounted in a fixed position and the stanchion carrying the cutter slide may be adjusted either by hand or by power. The spindle is driven by a powerful worm and worm wheel, and its momentum



GOULD & EBERHARDT 144-INCH GEAR CUTTER

is maintained by means of a heavy fly wheel.

The cutter arbor, which is 3 inches will take cutters up to 14 inches in diameter. The machine is also provided with an auxiliary cutter spindle which is driven from the main spindle through hardened helical gears. This makes it possible to use cutters of ordinary dimensions and to cut smaller gears, thus increasing the range of the machine.

A large number of speeds are provided and the feeds, which are independent of the speeds, may be conveniently changed through an improved gear box. The indexing worm wheel is of the split rim type. The indexing and feed mechanisms are connected with a system of interlocking levers which are so arranged that it is impossible for the feed clutches to engage until the indexing has been completely and accurately performed. The speed of the index wheel may be varied to suit the various sizes of gears. The machine is also arranged so that worm wheels may be hobbed automatically from solid blanks without previously gashing the teeth. The cutter spindle is geared in unison with the indexing worm, and single or multiple thread hobs may be used with equal facility. The cutter slide may be locked securely in any desired position.

A system of oil pans completely covers the worm wheel and keeps the floor clean, while a large oil pump provides lubricant for the cutters. The machine weighs about 35,000 pounds.

Directory of Chemists

The Chicago section of the American Chemical Society, with a membership of approximately 500, is compiling a census of chemical laboratories, chemists and chemically trained men in Chicago, and within a radius of 40 miles. An effort is being made to send circulars and blanks to all firms known to employ chemists asking co-operation, to the end of making the proposed census complete. However, as it is improbable all are being reached by this means, D. K. French, 2005 McCormick building, Chicago, secretary of the Chicago section, desires all who employ chemists in their plants to notify him of the name of the chemist and the position held.

This campaign is undertaken to give manufacturers a better understanding of the service which chemical science can render to various lines of business and bring about a greater community of interest between employer and chemist. The employment of men trained in chemistry at plants of iron and steel companies has been growing through the past few years and has now assumed an important position in the industry.

Wood Block Floors

One of the largest contracts ever let in Cleveland for creosoted wood blocks for a factory floor was awarded recently to F. A. Weaver, Swetland building, Cleveland representative of the Ayer & Lord Tie Co., Chicago, by the McClintic-Marshall Co., of Pittsburgh, which is building a plant at West 106th street and Madison avenue for the Parish & Bingham Co. The entire floor area of the new plant, approximately 9,000 square yards, will be paved with creosoted blocks.

Rolled Steel in Concrete Buildings

Dr. W. K. Hatt, head of the department of civil engineering of Purdue University, has conducted some tests which indicate that rerolled steel reinforcing bars may be safely used for concrete construction. In making the tests Dr. Hatt was assisted by Prof. H. H. Schofield, G. E. Lommel and C. Kolb.

About two thousand samples of rerolled bars were collected from five mills in New York, Pennsylvania and Illinois. Samples were taken at various times and under differing conditions, so that there could be no doubt but that they represented the average output of the mills. The differences in the product of the various mills were found to be comparatively slight. The samples were submitted to both tension and cold bending tests. The general tendency in all of the tests indicated a decrease in strength and an increase in elongation as the size of the bar increased. In part, this was considered to be due to the fact that a number of the larger sizes of bars were twisted. The tests showed that the straight, round bar is the strongest and the twisted bar the weakest of the designs commonly used. The twisted bars were found to fail more readily under the cold bend test than straight bars.

Operating a Small Open Hearth

How steel is made in a small oil fired furnace designed to operate on Mexican fuel

By E C Kreutzberg

ABOUT three years ago one of the proprietors of a crucible steel foundry in Newark, N. J., was trying out a new annealing furnace. It was equipped with a single atomizing burner which emitted, under pressure, a spray of fuel oil that had been preheated to a temperature just below the vaporizing point. The spray, on being ignited, fed a flame that carried the length and breadth of the furnace, coming into direct contact with the castings, piled about a foot deep on the furnace floor. Toward noon, when the foundryman was getting ready to go out for lunch, he gave the furnace a last look and decided to keep the flame burning during the noon hour. When he returned he was surprised to find the furnace contents, about $150 worth of castings, reduced to a puddle of molten steel. This incident led to considerable thought, which was turned to profitable account finally by the erection of a furnace embodying this discovery, devoted entirely to the melting of steel.

The furnace which thus had its origin in the accidental melting of a heat in an annealer is probably the only one of its kind in existence. In general design, it is a reverberatory furnace of the open-hearth type, with the exception that the regenerative principle, always the distinctive feature of the open-hearth, is not strongly emphasized. Indeed, the pre-heating of the air supply is an incident rather than an object in this furnace. As indicated in Fig. 6, the furnace is 22 x 7¼ feet in horizontal cross-section, and 10 feet high. Of the vertical dimension, 3 feet are below the surface of the ground. The hearth, made of tank plate, is 2½ feet high and 12 x 5 feet horizontally, and rests on a concrete foundation 3¼ feet deep. At each end of the furnace are two vertical ports for the admission of the air required for combustion. The ports are rectangular in cross-section, each 37½ x 16½ inches, discharging into the furnace about a foot above the level of the top. The roof is made of silica brick set on end. That part of the roof above the ports slopes downwardly from the ends, while the section of the roof above the hearth, 12 x 5 feet, is a flat arch, which springs from both the ends and the sides. This furnace, installed in the plant of the Riverside Steel Casting Co., Newark, N. J., is operated on fuel oil. The latter is introduced by means of burners which are pivoted externally at each end, as shown in Figs. 1 and 2, and which are operated alternately. The flame from each burner enters the end of the furnace horizontally, at a point about 1¼ feet above the level of the top of the hearth, being reverberated upon the hearth, the exhaust gases making their escape through the ports at the opposite end.

FIG. 1—CHARGING SIDE OF OIL-BURNING, 3-TON OPEN-HEARTH FURNACE

The ports at either end lead to two underground flues, which terminate in a valve of the Swindell butterfly type. The only brick checkerwork in the furnace is located between the two ports at each end. Originally the ports were separated by solid brick partitions, but this form of construction recently was abandoned, since it was found that by employing the checkerwork form of partition, the strain on the end walls is lessened. In order that the flame from the burners above may not be deflected sharply against the roof, the partitions are topped with solid brick arches. In

the operation of the furnace, the burners are employed alternately for periods of 20 minutes. Thus, at the end of each period, one burner is swung away from the furnace and the opposite burner swung in, while the direction of the air current is reversed by the butterfly valve. In this manner the furnace is regenerative to a certain extent, in that the checkerwork partitions, while not designed primarily to serve as regenerators, exert a regenerative influence. The checkerwork partitions are each 37½ x 27 inches in horizontal cross-section and 69 inches high.

The capacity of this furnace is approximately three tons per heat and, as a rule, two heats are made daily. The metal is tapped into a two-ton, bottom-pour, crane ladle, which rests in a cinder-pit at the back of the furnace. The hearth is lined with silica brick and sand and the practice is similar to that of acid open-hearth work. That the hearth may be heated properly, the oil flame is turned on about three hours before the charge is put in. Charging is done by hand, the material being laid on a peel which is slid in over the sill. Twenty per cent of the charge consists of low phosphorus and low sulphur pig iron and the remainder is boiler plate. Before tapping, a fracture test is made, which determines whether the metal shall be ored-down or pigged-back. The furnace consumes about 25 to 30 gallons of fuel oil per hour, which, considering the size of the installation, results in an extremely moderate fuel cost. With the charge in the furnace, the metal requires about 2½ hours exposure to the oil flame before it is ready to be tapped.

FIG. 2—END VIEW OF SMALL OPEN-HEARTH SHOWING ONE OF THE BURNER PORTS

The Riverside Steel Casting Co. was the first concern successfully to employ fuel oil from the Tampico fields in Mexico for the production of crucible steel. After experimenting with it for a considerable period, the company placed its first contract last May for the regular delivery of the Mexican oil. Prior to that time it had used American oil. With the development of processes, however, for further refining American oil, the oil companies became less willing to sell it, and the Riverside company finally found itself facing the alternative of substituting a cheaper fuel or retiring from business.

The oil handling system in use at the Riverside plant was laid out especially for the use of Mexican oil. However, its viscosity is so great that it will not flow freely by gravity, especially in cold weather. Therefore, the tank cars are connected to a live steam line from the boiler room, the steam being applied about a foot away from the discharge nozzle of the tank car. From the tank car, the warmed oil flows at the rate of about 2,000 gallons per hour into two storage tanks having capacities of 10,000 and 16,000 gallons, respectively. The latter are provided with steam coils which maintain the oil at a temperature of 70 to 80 degrees Fahr., at which it will flow freely. From the storage tanks, the oil is pumped through a steam-jacketed cylinder in the boiler room, where the temperature is raised to about 150 degrees Fahr. In the boiler room the oil also is run

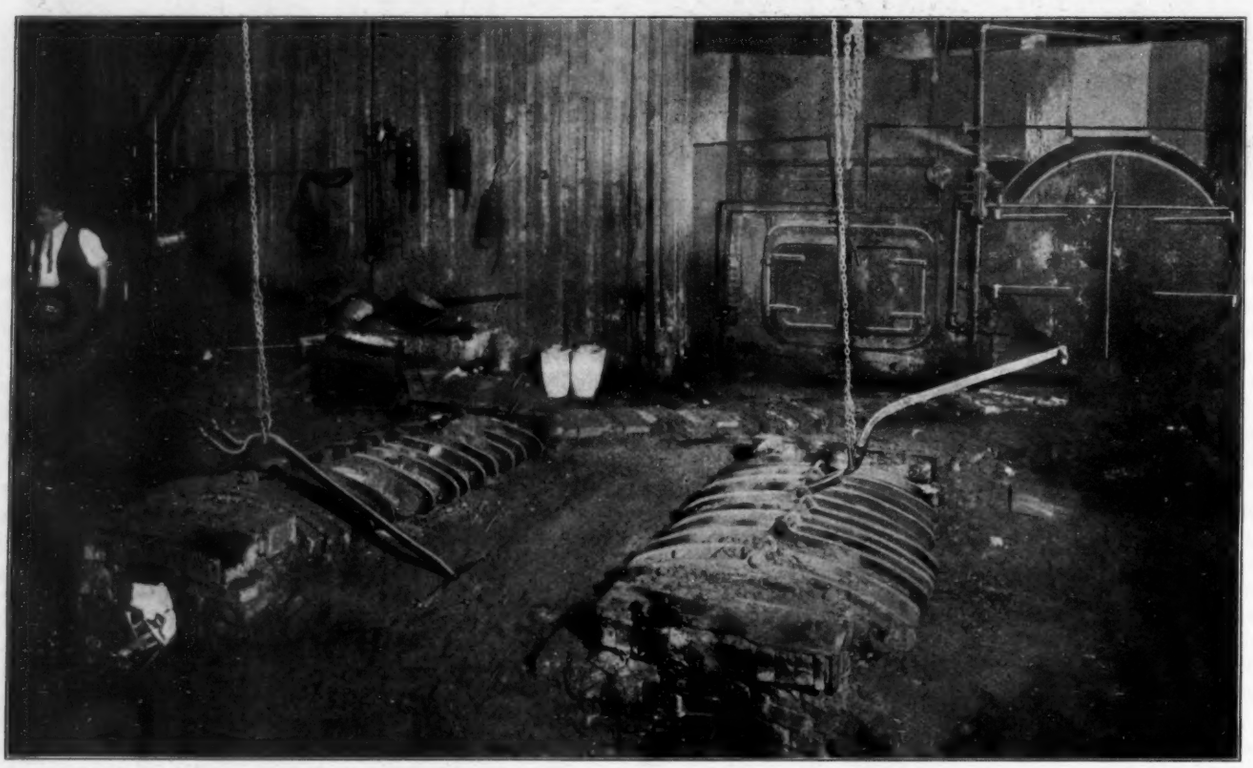


FIG. 3—THE TWO CRUCIBLE FURNACES WITH WASTE HEAT BOILERS IN THE BACKGROUND

through a strainer which frees it from impurities.

The oil must be delivered to the point of combustion at a temperature slightly below the vaporizing point, which is 175 degrees Fahr. To this end, the supply pipes leading to the burners are provided with small, steam heated pipes. The burner employed is of the W. N. Best type, each furnace, with the exception of the open-hearth, being provided with but one burner. The oil is delivered to the burners at a pressure of 10 pounds, while, for thoroughly atomizing the oil, a small amount of compressed air, at a pressure of 40 pounds per square inch, is supplied to the burner.

In addition to the open-hearth, the foundry is equipped with two, 10-pot crucible furnaces, shown in Figs. 3 and 7, each 6 feet by 27 inches, and 20 inches deep. The pots are arranged in pairs, the four crucibles nearest the combustion end occupying what is known as the melting zone and the remaining pots, the pre-heating zone. The oil flame is ignited about 4 a. m., and at 7 a. m. the first four or six pots are ready to be removed, the remaining pots then being moved forward into the melting zone, new pots being placed in the preheating zone to replace those moved forward. After the first heat at 7 a. m., four and six pots are taken from the furnace alternately at intervals of about 1½ hours through the remainder of the day. The average life of the crucible is three heats. No. 60 crucibles are used; their capacity on the first heat is about 120 pounds, on the second about 100 pounds, and on the third, 90 pounds. In order that the usefulness of the pots may not be decreased by the oxidation of the flame from the oil burner, the supply of air is so regulated that the oil is completely oxidized before the flame reaches the furnace proper. On an average, two tons is melted in each furnace daily. For charging the crucibles, boiler punchings are used, 50 per cent ferro-silicon and 80 per cent ferro-manganese being added to each crucible about 15 minutes before the completion of the melting operation. The oil is consumed in these furnaces at the rate of 20 to 25 gallons per hour, each.

The oil-burning annealing furnace, Fig. 4, is 6 x 22 feet, and 3½ feet deep, and is equipped with a single burner of the Best type. To eliminate the expense attached to two cleaning operations, the uncleaned castings, with the gates knocked off, are placed in the furnace and are subjected to a temperature of 1,500 or 1,600 degrees, Fahr., depending on the nature of the castings and the test that is required of them. At this temperature they are held for a period of four hours, when the furnace is sealed and permitted to cool slowly. After being removed from the furnace, the castings are transferred to the cleaning department. The oil consumption in this furnace averages about 20 gallons per hour. The exhaust ports connecting with the flues are located in side walls along the bottom of the furnace, being spaced at intervals of 2 feet. The capacity of the furnaces is between five and six tons of castings per charge. The Riverside Steel Casting Co. is an example of how, by the exercise of unremitting toil and patience, an inauspicious beginning may grow into a conspicuous success. It was founded about seven or eight years ago by Thomas Malcolm and J. S. Kinne, two employes of the Cooper, Wigand, Cooke Co., Delawanna, N. J., which went out of business about 1905. Messrs. Kinne and Malcolm had a capital of only about $3,000, and with this sum as a foundation they engaged in business in the building, on Riverside avenue, Newark, which had been occupied by the defunct Uniform Casting Co., for which at one time Mr. Malcolm had been foreman. The business thus established grew in volume until the erection of a new foundation became necessary and the present plant was completed about two years ago.

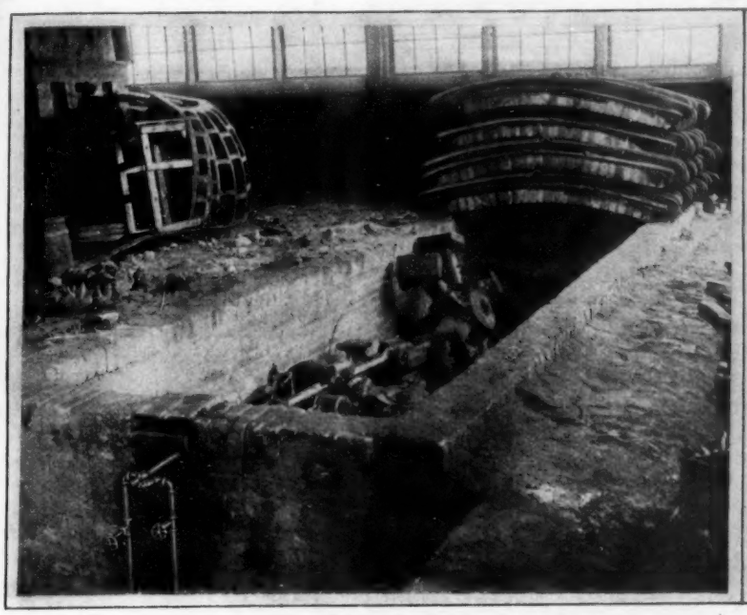


FIG. 4—THE OIL BURNING ANNEALING FURNACE

FIG. 5—HOW THE OIL FIRED MOLD DRYING OVEN IS HEATED

The foundry is divided into a center bay, 40 x 182 feet, and two side bays, 20 x 150 and 25 x 150 feet, respectively. The main bay is devoted entirely to floor molding, while the east bay accommodates the bench molders and, in addition, the annealing and heat-treating furnace, supply room, a compartment for housing an oxy-acetylene apparatus and the core-making department. The west bay contains the open-hearth furnace, the crucible furnaces, grinding and cleaning department, cold saws and, at the south end, the shipping platform. Alongside the west bay are the engine and boiler rooms, small leantos for housing the sand blast equipment, tumbling barrels, etc. The foundry

is served by a siding from the Pennsylvania railroad. The plant also embraces a two-story, 25 x 30-foot pattern shop and a two-story, 25 x 50-foot pattern storage building, as well as an office building.

The boiler room is equipped with two horizontal boilers having capacities of 100 and 150 horsepower, respectively. These are operated almost exclusively on waste heat from the crucible furnaces. An auxiliary oil burner also is provided for use when the crucible furnaces are not in operation. The steam from these boilers is used for operating the engine room, heating the oil system and heating the plant in cold weather. The engine room contains a 75-horsepower engine, direct-connected to a direct current generator, three air compressor units, and a switchboard for controlling the supply of current to the machinery in the plant.

The main bay of the foundry is commanded by a 10-ton, floor-operated, three-motor traveling crane of the Maris type, having a span of 40 feet and running the full length of the building. For drying the floor molds, two ovens, each 10 x 22 feet, and 8 feet high, are located outside the foundry at the end of the main bay. Each is provided with wide gage track and industrial cars. A third oven at the end of the east bay is of the same size, but is provided with double, narrow-gage tracks, with a capacity of two cars. This oven is used exclusively for drying small molds and cores, the core department being located in the adjacent bay. The ovens are all oil-burning, each being provided with a single burner of the Best type. The burners are located in front of each furnace in a firebrick trough extending the full length of the furnace. These are covered with firebrick arches, the flame entering the oven through slots between the arches. In Fig. 8 are shown two difficult

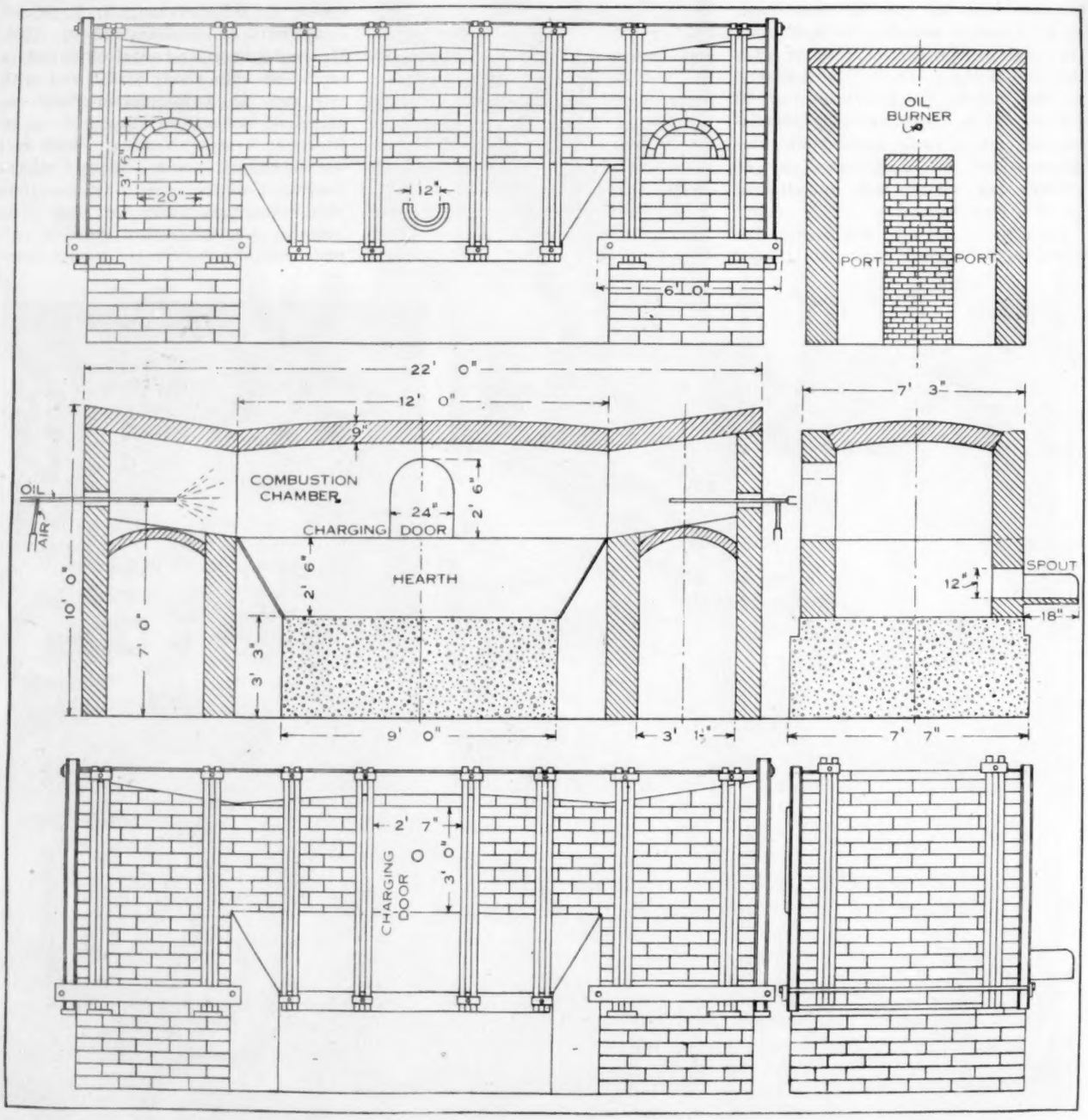


FIG. 6—BACK AND FRONT ELEVATIONS AND SECTIONAL VIEWS OF 3-TON OPEN-HEARTH FURNACE

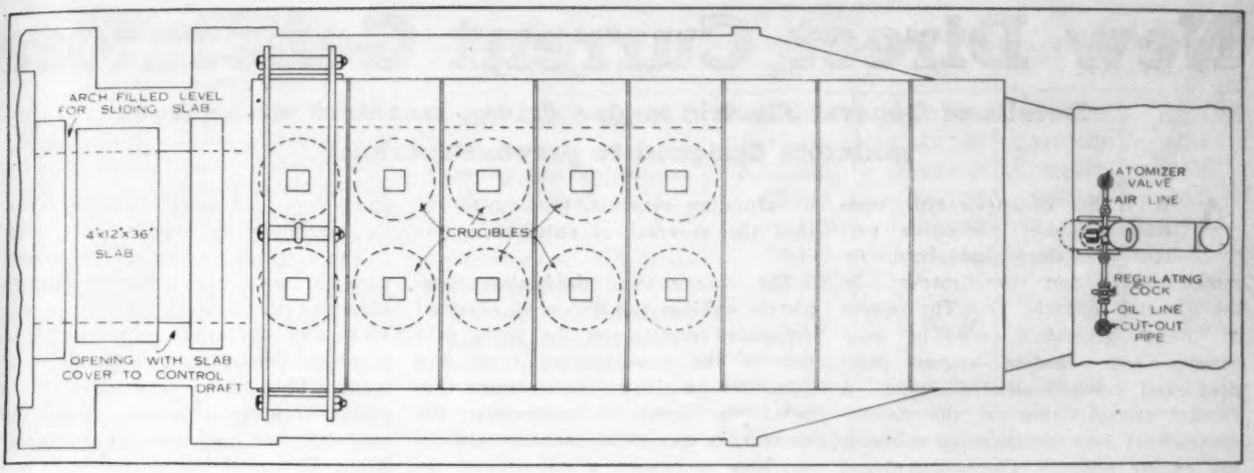


FIG. 7—PLAN OF 10-POT, OIL-FIRED CRUCIBLE FURNACE

castings recently produced at this foundry. They are scoops for 7 cubic yard clamshell buckets, and each casting weighed 4,000 pounds. The lips were about 1¼ inches thick, while the web was ¾ inch thick. These castings were poured with the convex surface up. The drag portion of the mold was finished in the floor in green sand. The cope was dry sand. The interior of the bottom portion was of cinders and coke, and this spongy mass, by means of wrought iron pipe leading to the outside of the mold, was flooded with water immediately after pouring, to ease the strains incidental to the shrinkage of the casting. The company produces castings for the general jobbing trade, and makes a specialty of marine work. Recently the casting of street railway crossings was undertaken successfully. The capacity of the plant is about 10 tons of steel castings per day.

As in most modern steel foundries, the Riverside Steel Casting Co. makes use of the oxy-acetylene welding equipment, reclaiming by this method a considerable number of castings which would otherwise go into the discard. The equipment consists of an acetylene generating apparatus, oxygen tubes, welding torch, blacksmith's forge, etc. The latter is coke-fired. The castings first are heated in the region of the defect, after which the filler wire is welded in the oxy-acetylene flame. In this manner, broken castings or castings with such flaws as blow-holes, shrink-holes or sand-holes, are saved at comparatively small expense.

The Marion Steam Shovel Co., Marion, O., has announced an increase of several hundred men to its force of 2,000, and a change in working hours from ten to nine hours a day.

A Good Year's Work

Results of a year's investigation of the iron mining industry in the United States are included in the recently issued annual report of Joseph A. Holmes, director of the Bureau of Mines. The investigation included methods of exploring for iron and measuring the ore in the ground, mining methods, costs, treatment of iron ores, safety measures, sanitary precautions, mine taxation and other matters pertinent to the iron ore industry. An investigation of the concentration of iron oxide in the Clinton ores of the Birmingham district was carried on by J. T. Singewald Jr.

Many deposits of titaniferous magnetite, some of them very large, have attracted considerable attention as possible sources of iron. With present furnace practice, however, reduction of ores carrying more than a small percentage of titanium is difficult and expensive, and consequently such ores are refused by the furnaces. In its endeavor to bring about the utilization of undeveloped mineral resources in the United States, the bureau of mines completed an investigation in relation to the treatment of titaniferous iron ores by magnetic concentration. The results of this investigation, which was conducted by J. T. Singewald Jr., have been transmitted for publication in bulletin form.

An investigation of the possibility of utilizing titaniferous magnetites in the electric furnace for the direct manufacture of iron-titanium alloys, such as are being used in making special grades of steel, is to be undertaken by the bureau.

Would Promote Better Relations

An Exhibit of Better Industrial Relations will be held April 18-25 at No. 2 West Sixty-fourth street, New York City. The exhibit will show the devices in modern business which tend to make more harmonious the relations between employer and employe, and to better the conditions of employment.

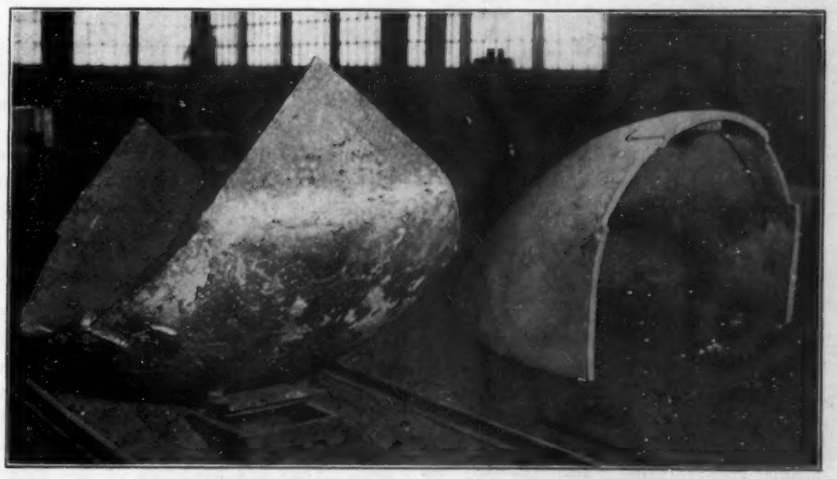


FIG. 8—STEEL CLAM SHELL BUCKET CASTINGS

New Direct Current Generators

Details of General Electric engine driven machines with commutators designed to prevent sparking

A NEW line of engine type, commutating pole, continuous current generators has been recently placed on the market by the General Electric Co. The speeds of these generators are in conformity with modern engine practice, and were selected after a careful consideration of the recommendations and requirements of leading engine builders. Compound wound machines, automatically compensating for line drop in the distribution system, may be built for any desired degree of compounding from no-load to full-load, although four to five per cent is usually sufficient for average conditions and standard field windings provide for this amount. The frame is designed for installing on the engine bed-plate or masonry foundations, and the armature is bored for mounting on the engine shaft.

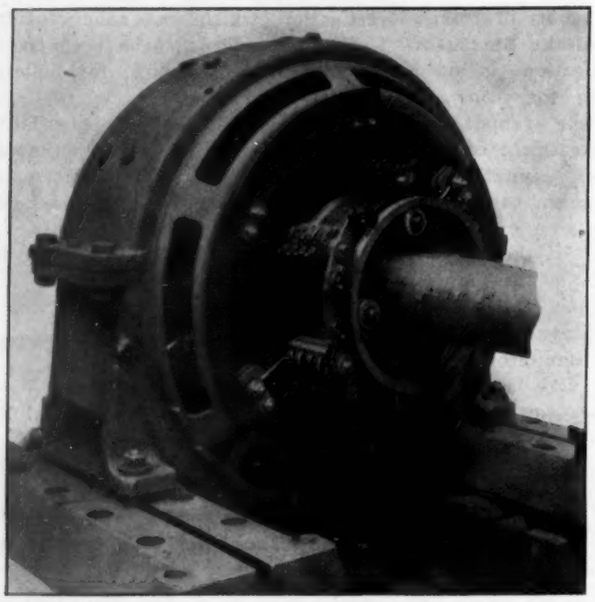


FIG. 1—ENGINE TYPE GENERATOR MOUNTED ON TEST FLOOR

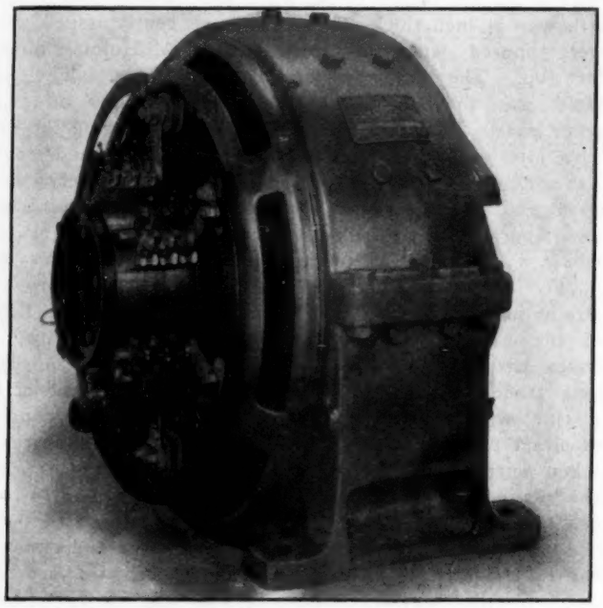


FIG. 2—BRUSH CONSTRUCTION OF ENGINE TYPE GENERATOR

The utilization of commutating poles in these generators is one of the distinctive features of the new design. It is said to permit operation over an extremely wide range of load and voltage with fixed brush position and sparkless commutation. The commutor winding produces a magnetic field flowing in a direction that assists the reversal of current in the coil undergoing commutation, and is also directly opposed to the field generated by armature reaction, tending to retard the reversal of current in this coil.

The commutating field thus completely nullifies the distortive effect of armature reaction on the main field flux in the commutating zone, and generates an electro-motive force that helps the brush to commutate the current in a natural manner without sparking and with a consequent increased life of the commutator and brushes. Inasmuch as the commutating windings are directly in series with the armature, their strength varies directly with the armature current and provides the correct rectifying effect for proper reversal of current in the coils at all loads. Hence it is unnecessary to shift the brushes as the load changes.

Another new feature of this line of generators is the development of the three-wire machines with a special type of revolving compensator. The advantages of the three-wire system for the distribution of electrical energy at low voltages are well understood. The principal advantage is the fact that a 125-250-volt three-wire system requires about one-third the amount of copper in the distribution system required by a 125-volt two-wire system. Thus the adoption of the three-wire system for a combined lighting and power load saves about two-thirds the investment in copper.

The adoption of the revolving compensator with one collector ring for obtaining the neutral connection with three-wire operation is somewhat of a radical departure from previous designs. This design supersedes the familiar separate stationary compensator and two collector ring arrangement. The revolving compensator consists of a circular magnetic core upon which are mounted suitable exciting coils, the core with its coils being assembled on a cast bracket bolted directly to the back end of the armature spider. The compensator fits under the overhanging end windings of the armature, projecting but a short distance beyond the main winding, and requires no additional allowance in floor space.

The compensator windings are connected to the main armature winding at proper points, and the neutral connection is taken through the armature spider to a single collector ring mounted on the outer end of the commutator shell. The neutral brushes bearing on this ring are supported by and insulated from the main brush-holder studs. The simplicity of this design, self-contained with the armature, eliminates floor space taken by

(*Continued on page* 610*b*)

Full Details

Concerning Production of All grades of pig iron

The Bureau of Statistics of the American Iron and Steel Institute has received from the manufacturers statistics of the production of all kinds of pig iron by grades in the United States in the calendar year 1913; also statistics of the consumption of iron ore, limestone, coke, coal, charcoal, etc., in the manufacture of pig iron during the same year.

Of the total production of pig iron in 1913 over 37.4 per cent was Bessemer and low phosphorus, as compared with over 39.2 per cent in 1912; over 16.8 per cent was foundry, ferro-silicon, and high-silicon, against over 17 per cent in 1912; over 40.4 per cent was basic, against over 38.4 per cent in 1912; over 1 per cent was forge, against over 1.5 per cent in 1912; over 0.7 per cent was spiegeleisen and ferro-manganese, against over 0.7 per cent in 1912; and over 3.2 per cent was malleable Bessemer, against over 2.7 per cent in 1912. White and mottled pig iron, miscellaneous ferro-alloys, castings made direct from the blast furnace, etc., amounted to over one-fifth of 1 per cent in 1913, against less than one-fifth of 1 per cent in 1912.

The Institute estimates that about 58,274,000 gross tons of domestic and foreign iron ore, ore briquettes, etc., not including mill cinder, scale, scrap, etc., were consumed in the manufacture of pig iron in 1913, as compared with about 55,656,000 gross tons of similar materials in 1912. The average consumption of iron ore in 1913 per ton of pig iron made was about 1.882 gross tons, as compared with about 1.872 tons in 1912. From 800,000 to 900,000 tons of iron ore are also annually consumed by rolling mills and steel works.

In addition to the 58,274,000 gross tons of iron ore, ore briquettes, etc., consumed in 1913 by blast furnaces in the manufacture of pig iron, about 3,009,000 tons of mill cinder, scale, scrap, slag, flue dust, zinc residuum, etc., were also used, as compared with about 4,319,000 tons in 1912. Adding these figures to the ore above reported gives a total consumption in 1913 of about 61,283,000 tons, or an average of about 1.979 tons of ore and other metallic material used per ton of pig iron made, as compared with a consumption of about 59,975,000 tons, or an average of 2.017 tons, in 1912.

Accompanying tables give details as to the production of the various grades of pig iron in the United States.

The production of pig iron in Canada in 1913, including ferro-silicon, ferro-titanium, and ferro-phosphorus, amounted to 1,015,118 gross tons, against 912,878 tons in 1912, an increase of 102,240 tons, or nearly 11.2 per cent. The production in 1913 was much the largest in the history of the Dominion. For the first time the output exceeded 1,000,000 tons. Of the total 986,848 tons were made with coke and 28,270 tons with charcoal, coke and electricity, etc., against

TOTAL PRODUCTION OF PIG IRON BY GRADES

Grades—Gross tons.	1912.	1913.	Inc. or Dec.	Per cent.
Bessemer and low-phos.....	11,664,015	11,593,385	†70,630	†00.6
Basic.....	11,417,886	*12,537,746	1,119,860	09.8
Foundry and ferro-silicon..	5,073,873	5,219,918	146,045	02.8
Malleable Bessemer.....	825,643	993,736	168,093	20.3
Forge pig iron.....	469,183	324,832	†144,351	†30.7
Spiegeleisen.....	96,346	110,338	13,992	14.5
Ferro-manganese.....	125,378	119,496	†5,882	†04.6
White and mottled, direct castings, ferro-tit., etc.....	54,613	66,850	12,237	22.4
Total.....	29,726,937	30,966,301	1,239,364	04.1

* Include a small quantity of basic pig iron made with charcoal. † Decrease.

PRODUCTION OF BESSEMER AND BASIC PIG IRON BY STATES

States. Gross tons.	Bessemer and low-phosphorus.			Basic pig iron.		
	1911.	1912.	1913.	1911.	1912.	1913.
N. Y. and N. J.	449,841	621,891	565,760	321,765	386,457	564,352
Pennsylvania..	3,461,265	4,402,291	4,479,379	5,168,762	6,490,096	6,936,032
Maryland.....	255,186	218,603	289,959	.....	.....	.....
Va. and Ala....	3,050	.....	.....	445,892	671,478	831,188
W. Va., Ky., and Tenn....	367,436	316,817	293,845	.....	.....	.....
Ohio.....	3,283,970	4,174,226	4,186,703	1,111,741	1,557,955	1,775,225
Illinois.....	1,455,865	1,823,655	1,695,076	1,224,254	2,035,910	2,167,389
Indiana.....	.....	.....	.....			
Mich., Wis., Mo., Col., and Cal.....	132,690	106,532	82,663	247,606	275,990	263,560
Total.....	9,409,303	11,664,015	11,593,385	8,520,020	11,417,886	12,537,746

PRODUCTION OF FOUNDRY AND FORGE PIG IRON BY STATES

States. Gross tons.	Foundry, ferro-sil., high-sil., etc.			Forge pig iron.		
	1911.	1912.	1913.	1911.	1912.	1913.
Mass. and Conn.	9,649	17,366	12,810	.....	.....	.....
N. Y. and N. J.	642,416	794,332	790,937	35,163	.....	18,308
Pennsylvania....	771,303	1,180,096	1,038,900	198,956	234,558	175,965
Md., Va., W. Va.	247,557	229,796	293,599	22,524	21,421	26,560
Ky. and Miss....	50,722	50,361	43,931	.....	.....	.....
Tennessee.....	275,091	299,529	247,165	6,089	2,579	2,469
Georgia.....	1,200	.....	.....	.....	.....	.....
Alabama.....	1,240,808	1,075,564	1,183,877	38,715	115,303	46,192
Ohio.....	616,904	666,659	787,184	107,394	95,322	55,338
Indiana and Ill.	99,115	119,103	173,256	.....	.....	.....
Michigan	258,851	347,781	331,666	.....	.....	.....
Wisconsin.....	160,231	213,045	220,853	.....	.....	.....
Minnesota.....	71,850	44,232	71,869	.....	.....	.....
Mo. and Col.....	23,243	36,009	23,871	.....	.....	.....
Total.....	4,468,940	5,073,873	5,219,918	408,841	469,183	324,832

886,506 tons made with coke and 26,372 tons made with charcoal, coke and electricity, etc., in 1912.

More Than Tripled

Was production of Bessemer rails by open hearth

The Bureau of Statistics of the American Iron and Steel Institute has received from the manufacturers statistics of the production of all kinds of rails in the United States in the calendar year 1913.

The production of all kinds of rails in 1913 amounted to 3,502,780 tons, against 3,327,915 tons in 1912, an increase of 174,865 tons, or over 5.2 per cent. Included in the total for 1913 are 195,659 tons of girder and high T steel rails for electric and street railways, against 174,004 tons in 1912 and 205,409 tons in 1911. The maximum production of all kinds of rails was reached in 1906, when 3,977,887 tons were rolled, or 475,107 tons more than were produced in 1913.

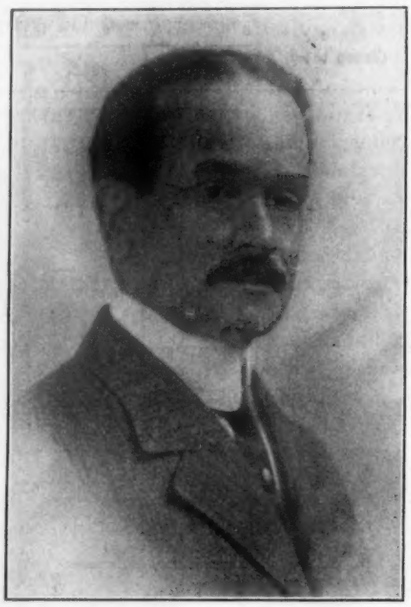
Of the total production of rails in 1913, 3,303,944 tons were rolled from open-hearth, Bessemer, and electric steel blooms or billets, against 3,165,939 tons in 1912; 43,793 tons were rolled from new seconds, defective new rails, and steel crop ends, against 42,586 tons in 1912; and 155,043 tons were rerolled from old steel rails or were renewed steel rails, against 119,390 tons in 1912. No iron rails were reported for 1912 or 1913.

Included in the 157,479 tons of rails rolled in 1913 and classified as electric and rerolled steel are 2,436 tons of rails rolled from electric steel and 155,043 tons of renewed rails or rails rolled from old steel rails which the makers were unable to classify as open-hearth or Bessemer. In 1912, there were 3,455 tons of rails rolled from electric steel and 119,390 tons rolled from old steel rails or from renewed rails. Twenty-five works in 13 states rolled or rerolled rails in 1913, as compared with 24 works in 12 states in 1912.

In 1913 nearly 29.9 per cent of the rails weighing less than 50 pounds to the yard, nearly 48.7 per cent of the rails weighing 50 pounds and less than 85 pounds, and over 87.2 per cent of the rails weighing 85 pounds and over were rolled from open-hearth steel, while in the same year nearly 41 per cent of the rails weighing less than 50 pounds to the yard, over 44.8 per cent of the rails weighing 50 pounds and less than 85 pounds, and nearly 12.1 per cent of the rails weighing 85 pounds and over were rolled from Bessemer steel. In addition, in 1913 over 29.1 per cent of the rails weighing less than 50 pounds to the yard, over 6.5 per cent of the rails weighing 50 pounds and less than 85 pounds, and less than 1 per cent of the rails weighing 85 pounds and over were rolled from electric ingots and old steel rails or were renewed rails.

Elect President

Murray Shipley the newly elected president of the Cincinnati branch, National Metal Trades Association, was graduated from the Sheffield Scientific School, Yale University, in 1885, and eight years later entered the machine tool business in Cincinnati, forming at that time with William Lodge the firm of Lodge & Shipley Machine Tool Co., to engage in the manufacture of lathes. Mr. Shipley has served as vice president of this concern for over 20 years and has been actively engaged in the promotion of the Cincinnati branch of the Metal Trades Association since its installation.



MURRAY SHIPLEY

A meeting of machinery manufacturers of Cincinnati, O., was held in that city recently to make arrangements to take the necessary steps to bring interurban cars into that city so that freight may be handled from outside points on express time. The details of the campaign will be evolved at the next meeting which will be held in April.

Wm. H. Pirrong, formerly sales manager of the Standard Welding Co. and treasurer of the Ransford Engine Co., Cleveland, died March 19, at his home in Lakewood, a suburb of Cleveland, aged 56 years.

Iron and Steel

Closely connected with railroad business by exhibits

The fifteenth annual convention of the American Railway Engineering Association, which closed in Chicago, March 20, was featured by an unusually attractive exhibit of railway equipment and appliances at the Coliseum under the auspices of the National Railway Appliances Association. The nature of the exhibits emphasized the close relationship which exists between the iron and steel industry and the railroad business, and out of the total of 160 individual displays all but about half a dozen included apparatus or machinery manufactured from iron and steel. The exhibit included those appliances which are used in the track and roadway departments of the railroads, as contrasted with rolling stock or other movable equipment. The displays included rails, various forms of track fastenings, bridge work, tanks, signaling devices, etc. The growing tendency to use manganese steel in frogs, crossings, switches, etc., was evident; other alloy steels, including those containing vanadium and titanium, are also being used quite extensively for special track work. Among the exhibitors who are closely identified with the iron and steel business were the following:

Ajax Forge Co., Chicago.
American Hoist & Derrick Co., St. Paul.
American Rail Joint Co., Chicago.
American Rolling Mill Co., Middletown, O.
American Steel & Wire Co., Cleveland.
S. F. Bowser & Co., Ft. Wayne, Ind.
The Buda Co., Chicago.
Cambria Steel Co., Johnstown, Pa.
Carnegie Steel Co., Pittsburgh.
Geo. B. Carpenter Co., Chicago.
Chicago Bridge & Iron Works, Chicago.
Chicago Pneumatic Tool Co., Chicago.
Cleveland Frog & Crossing Co., Cleveland.
Clyde Iron Works, Duluth.
Crerar Adams & Co., Chicago.
Detroit Graphite Co., Detroit.
Jos. Dixon Crucible Co., Jersey City, N. J.
Elyria Iron & Steel Co., Elyria, O.
Fairbanks, Morse & Co., Chicago.
Galion Iron Works & Mfg. Co., Galion, O.
General Electric Co., Schenectady, N. Y.
Illinois Steel Co., Chicago.
H. W. Johns-Manville Co., Chicago.
Keystone Grinder & Mfg. Co., Pittsburgh.
Lackawanna Steel Co., Buffalo.
Maryland Steel Co., Baltimore.
National Carbon Co., Cleveland.
National Malleable Castings Co., Chicago.
Spencer Otis Co., Chicago.
Pennsylvaina Steel Co., Steelton, Pa.
Pittsburgh-Des Moines Steel Co., Des Moines, Ia.
Pittsburgh Steel Co., Pittsburgh.
Prest-O-Lite Co., Indianapolis.
Scully Steel & Iron Co., Chicago.
Sellers Mfg. Co., Chicago.
Stark Rolling Mill Co., Canton, O.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
Taylor-Wharton Steel Co., Highbridge, N. J.

Pay Roll Largest in Its History

United States Steel Corporation makes remarkable record in spite of depression of part of last year

In spite of the decided slump in business during the latter part of the year, the twelfth annual report of the United States Steel Corporation shows that the earnings for 1913 were larger than for any year since 1910, while the volume of business was also very large and the production shows a falling off of only 1.05 per cent compared with 1912. The number of employes and the pay roll were larger than ever before.

The volume of business done by all companies during the year, as represented by their combined gross sales and earnings, equaled the sum of $796,894,299.23, as compared with a total of $745,505,515.48 in the preceding year.

This amount represents the aggregate gross value of the commercial transactions conducted by the several subsidiary companies, and includes sales made between the subsidiary companies and the gross receipts of the transportation companies for services rendered both to subsidiary companies and to the public.

The earnings for the year resulting from the above gross business represent the combined profits accruing to the several corporate interests on the respective sales and services rendered, each of which is in itself a complete commercial transaction.

The gross sales by manufacturing, iron ore and coal and coke companies to customers outside of the corporation were $518,999,605 in 1913, compared with $494,637,808 in 1912, while the inter-company sales were $211,910,441 in 1913, and $189,257,318 in 1912.

The gross earnings and receipts of transportation and miscellaneous companies were: For transportation companies, $57,726,430 in 1913, compared with $53,665,603 in 1912; for miscellaneous companies, $8,257,823 in 1913, and $7,944,786 in 1912.

Employes' Stock Subscriptions

In continuance of the plan observed in previous years, beginning with 1903, the employes of the United States Steel Corporation and the subsidiary companies were, in January, 1914, offered the privilege of subscribing for preferred and common stock of the Corporation.

The subscription price was fixed at $105 per share for the preferred and $57 per share for the common stock. The annual allowances for five years for special compensation or bonus to be paid subscribers who retain their stock were fixed at $5 per share for the preferred and $3.50 per share for the common stock. The conditions attached to the offer and subscription, aside from the features of subscription price and the amount of special compensation or bonus to be paid, were substantially the same as those under which stock has been offered to employes in each of the previous ten years.

Subscriptions were received from 46,498 employes for an aggregate of 42,926 shares of preferred and 47,680 shares of common stock.

Employes on Pay Rolls

The average number of employes in the service of all companies during the year 1913, in comparison with the year 1912, was as follows:

Employes of	1913. Number.	1912. Number.
Mfg. properties	165,277	161,774
Coal and coke prop.	24,996	24,394
Iron ore properties	13,789	12,597
Transp. properties	21,951	19,438
Misc. properties	2,893	2,822
Total	228,906	221,025
Total salaries and wages paid	$207,206,176	$189,351,602
Average salary or wage per employe per day:		
All employes, exclusive of gen. adminis. and selling force	$2.85	$2.68
Total employes, including gen. admin. and selling force	2.92	2.75

Production Record

The volume of business conducted by the subsidiary companies during the year 1913 was large. During the last half of the year there was a material diminution in the amount of new orders received; but the large tonnage of business carried forward from 1912, together with heavy bookings in the first quarter of 1913, enabled the mills to operate to very nearly their full capacity until September. In the last quarter, there was a severe curtailment of operations. As a total result, the production for the year of steel products for sale fell slightly below the output in 1912.

Although the aggregate tonnage of production of rolled steel products shows a falling off of 1.05 per cent, there was an increase in the output of all materials except blooms, billets and sheet bars for sale, wire products, sheets and tin plate. The decreases were as follows:

	Tons.	Per cent decrease.
Blooms, billets and sheet bars for sale	261,577	23.7
Wire products	219,777	12.0
Sheets and tin plate	228,070	15.1
	709,424	16.9

The output for the year of rolled and other finished products for sale was about 88 per cent of the total annual productive capacity of the plants. The cement production was about 93 per cent of full plant capacity.

Notwithstanding the total tonnage of shipments was substantially the same in 1913 as in the preceding year, the total earnings (exclusive of charges for interest on subsidary companies' securities outstanding) increased $29,240,215, or 24.8 per cent. This increase is attributable principally to higher average prices having been received in 1913. In 1912 the prices received for the great bulk of the output were, however, on a very low level. In 1913 the average price received for the entire tonnage of rolled and other finished products shipped was, in respect of the domestic business, $2.40 higher per ton than the similar average price received in 1912; and for the export business, $4.16 more per ton. Better prices also were received for cement and pig iron.

The reduction in export shipments in 1913 from 1912 arose in part from a slackening in the demand, due principally to the money stringency in foreign markets during 1913, and in part to the inability of the mills to furnish, when required, sufficient material for export in the first six months of the year because of the demands of domestic consumers. The export shipments to Mexico were also curtailed owing to the unsettled condition of affairs in that country.

The order books of the subsidiary companies at the close of business Dec. 31, 1913, showed unfilled orders amounting to 4,282,108 tons. A considerable part of this tonnage covered contract requirements extending through the first six months of 1914 and, therefore, only in part were the orders included in the total available for immediate rolling and shipment.

Contemporaneously with the sharp falling off in the mid-summer of 1913

of new business offering, there was a weakening in prices on the majority of the classes of products. This decline in prices steadily continued until the early part of 1914, when there was a moderate reaction.

Income Tax

The total charges for the year for taxes levied against the Corporation and its subsidiary companies, including the federal income tax for 1913, was $13,225,882, an increase of $3,385,511 over the preceding year. The greater part of this increase was in the state and local taxes levied against the iron ore and transportation properties. The federal income tax was also materially larger than the corporation excise tax charged in previous year, owing to the fact that the net income subject to tax was considerably greater in 1913 and because the scope of the new income tax is broader than was that of the excise tax.

The inventories of raw materials, manufacturing supplies and semi-finished and finished products on hand at the close of the year show a net increase in value of $15,222,537 compared with Dec. 31, 1912. This increase it attributable in part to the larger stocks on hand arising from the curtailment of operations which took place in the last quarter of the year, and to the broadening of the policy of carrying stocks of finished products at both domestic and foreign warehouses.

	1913	1912	*Increase or Decrease*
EARNINGS—Exclusive of charges for interest on Bonds and Mortgages of Subsidiary Companies	$147,166,616.81	$117,926,402.02	$29,240,214.79 Inc.
Less, Interest on outstanding Bonds and Mortgages of the Subsidiary Companies	9,985,271.98	9,751,728.90	233,543.08 Inc.
Balance of Earnings	$137,181,344.83	$108,174,673.12	$29,006,671.71 Inc.
Less, Charges and Allowances for Depreciation, viz.:			
Sinking Funds on Bonds of Subsidiary Companies	1,850,477.80	1,821,481.68	28,996.12 Inc.
Depreciation and Extraordinary Replacement Funds	23,972,376.13	22,734,365.82	1,238,010.31 Inc.
Sinking Funds on U. S. Steel Corporation Bonds	6,037,798.99	5,775,902.37	261,896.62 Inc.
Net Income in the year	$105,320,691.91	$77,842,923.25	$27,477,768.66 Inc.
Deduct.			
Interest on U. S. Steel Corporation Bonds outstanding	22,532,690.98	22,817,470.75	284,779.77 Dec.
Premium paid on Bonds redeemed by Sinking Funds, viz.:			
On U. S. Steel Corporation Bonds	683,597.50	654,476.88	29,120.62 Inc.
On Subsidiary Companies Bonds	99,720.26	113,228.69	13,508.43 Dec.
Balance	$82,004,683.17	$54,257,746.93	$27,746,936.24 Inc.
Deduct: Net Balance of sundry charges and credits, including adjustments in inventories and of various accounts	787,697.55	17,697.56	769,999.99 Inc.
Balance	$81,216,985.62	$54,240,049.37	$26,976,936.25 Inc.
Dividends on U. S. Steel Corporation Stocks, viz.:			
Preferred, 7 per cent	25,219,677.00	25,219,677.00	
Common, 5 per cent	25,415,125.00	25,415,125.00	
Surplus Net Income in the year	$30,582,183.62	$3,605,247.37	$26,976,936.25 Inc.
Appropriated from Surplus Net Income on account of expenditures made on authorized appropriations for additional property and construction and the discharge of capital obligations	15,000,000.00		15,000,000.00 Inc.
Balance of Surplus for the year	$15,582,183.62	$3,605,247.37	$11,976,936.25 Inc.

COMPARATIVE INCOME ACCOUNT FOR 1913 AND 1912

Record for Outlays

The expenditures made during the year for repairs, maintenance and general up-keep of the properties, in comparison with the outlays for similar purposes in 1912, were as follows:

	1913.	1912.
Ord. rep'rs and main.	$52,551,630	$43,853,137
Extraordinary replacements and gen. rehabilitation	7,391,340	4,895,300
Total	$59,942,970	$48,748,437

The foregoing disbursements in 1913 exceeded the amount of outlays made for similar purposes in any previous year. The plants and properties of the several subsidiary companies are in excellent physical condition.

The aggregate amount of charges to and allowances from gross earnings for the year to cover deterioration arising from wear and tear of improvements, obsolescence and exhaustion of minerals, was $84,237,608, compared with $75,425,854 for the preceding year. Included in these respective totals are the above mentioned expenditures for ordinary repairs and maintenance.

The expenditures made and charges incurred during the year by the Corporation and the subsidiary companies for additional property, new plants, extensions and construction, less credits for property sold and for stripping and development work at mines aggregated the net sum of $41,999,098.33, viz.:

For the Gary, Ind., prop.	$2,960,124.92
For the new Minn. steel plant at Duluth, Minn., and the railroad connecting the same with trunk lines	5,912,027:44
For Tennessee Coal, Iron & R. R. Co. extensions	1,274,440.84
For acquirement of the fee title to various iron ore properties previously held under royalty contracts	11,670,181.87
For all other properties and extensions, including net credit account of mine stripping and development operations	20,182,323.26
	$41,999,098.33

The charge, as above, for acquirement of the fee title to iron ore properties previously held by the subsidiary companies under royalty contracts, was based in part on commuting to their present day value certain of the royalties which would have become payable under the contracts; and in part on the par value of certain of the royalties, issuing, however, in settlement for the amount thereof non-interest-bearing purchase money obligations or notes payable in installments during the period for which the contracts had yet to run. Of the total charged as above, $2,283,677.63 only has been paid in cash, and the balance, $9,386,504.24, is covered by purchase money notes of the Oliver Iron Mining Co., guaranteed by the United States Steel Corporation. Of these notes, $1,240,403.68 bear 4 per cent interest per annum, and $8,146,100.56 are non-interest-bearing notes. The notes are payable in annual installments of various sums from 1915 to 1954, inclusive.

Construction work on the new steel plant at Duluth, Minn., and the connecting railroad to serve the same proceeded during the year, additional expenditures having been made at a cost of $5,912,027. It is expected

this plant will be completed for operation in the spring of 1915. The plant will comprise two blast furnaces, 10 open-hearth furnaces, one 40-inch blooming mill, one combination 28-inch and 18-inch rail and shape mill, one combination 16-inch, 12-inch and 8-inch merchant mill, and a by-product coke plant of 90 ovens, together with the necessary complement of auxiliary departments, such as power plants, pumping stations, machine and other shops. There has been laid out adjacent to the plant a subdivision on which work has been commenced in the building of houses for use by employes. The total expenditures made to the close of 1913 for acquirement of the land for site of steel plant and subdivision, for construction of plant, development of subdivision and building of the railroad, was $13,445,648, all of which has to date been advanced from the current assets of the Corporation. There is under consideration a suggestion to reimburse the treasury for a substantial part of this outlay, and additional outlays yet to be made in connection with the work, through an issue and sale of bonds secured on the property.

Work was commenced during the year on the construction of an additional cement plant located adjacent to the new steel plant at Duluth, Minn. This cement plant will have an annual capacity of 1,400,000 barrels. It is being constructed by the Universal Portland Cement Co., a subsidiary company. The plant will utilize in the manufacture of cement blast furnace slag from the steel plant. It will probably be completed for operation in 1915.

The unfinished new rod mill and wire plant of the American Steel & Wire Co., located at Fairfield, a suburb of Birmingham, Ala., was completed during the year and went into operation in February, 1914. The plant has a capacity of 400 tons per day of finished wire products of various kinds.

Large outlays were made in the construction at the Edgar Thomson Works of Carnegie Steel Co. of a new 14-furnace open-hearth plant, and for the relocation, rebuilding and enlargement of the blooming mill and the No. 2 rail mill. These mills will produce a greater diversity of product and will otherwise be of advantage. A considerable part of this new work was completed and in operation at the close of the year. At Duquesne Works of the Carnegie Steel Co. a new 10-inch electrically-driven bar mill was installed; and at McCutcheon Works a new steel hoop mill was completed and placed in operation.

At the South Works of the Illinois Steel Co. two additional open-hearth furnaces and a new 300-ton hot metal mixer were installed; and at the Gary, Ind., Works a new 36-inch reversing slabbing mill was completed and placed in operation.

The various subsidiary railway companies during the year acquired by purchase or construction 58 additional locomotives and 3,578 cars of various kinds. They also acquired on replacement account 12 locomotives and 293 cars. There were placed in commission on the Great Lakes during the year three new 12,000-ton ore-carrying steamers; and one additional freight steamer was purchased for service in the export trade.

In the construction of a new steel ore dock of 384 pockets at Duluth, the Duluth, Missabe & Northern Railway Co. expended during the year $1,516,830. This dock will be completed in 1914 and its total cost will be about $3,000,000.

In addition to the outlays during the year for the construction of new plants and for the additions and betterments above specifically referred to, the several subsidiary companies expended in the aggregate a large amount for sundry miscellaneous additions, extensions and improvements, the more important of which are set forth in the several statements and tables printed in this report.

At the close of the year the amount unexpended on authorized appropriations for new plants, construction and extraordinary replacements, including iron ore mine stripping program for 1914, was, approximately, $26,000,000. This total is largely made up of amounts to be expended in completing the new plants and work under

Products	1913	1912
IRON ORE MINED	*Tons*	*Tons*
In the Lake Superior Ore Region		
Marquette Range	583 266	551 575
Menominee Range	980 346	995 401
Gogebic Range	1 871 700	1 497 950
Vermilion Range	1 301 163	1 301 663
Missabe Range	21 634 206	20 001 953
In the Southern Ore Region		
Tennessee Coal, Iron & R. R. Co.'s Mines	2 367 770	2 079 907
Total	28 738 451	26 428 449
COKE MANUFACTURED		
In Bee-Hive Ovens	11 062 138	11 554 840
In By-Product Ovens	5 601 342	5 164 547
Total	16 663 480	16 719 387
COAL MINED, not including that used in making Coke	6 705 381	5 905 153
LIMESTONE QUARRIED	6 338 509	6 124 541
BLAST FURNACE PRODUCTION		
Pig Iron	13 879 706	13 990 329
Spiegel	65 236	53 829
Ferro-Manganese and Silicon	135 788	142 006
Total	14 080 730	14 186 164
STEEL INGOT PRODUCTION		
Bessemer Ingots	6 131 809	6 643 147
Open Hearth Ingots	10 524 552	10 258 076
Total	16 656 361	16 901 223
ROLLED AND OTHER FINISHED STEEL PRODUCTS FOR SALE		
Steel Rails (Heavy and Light Tee and Girder)	1 927 745	1 857 407
Blooms, Billets, Slabs, Sheet and Tin Plate Bars	842 175	1 103 752
Plates	1 108 147	1 076 308
Heavy Structural Shapes	998 624	898 537
Merchant Steel, Bars, Hoops, Bands, Skelp, Etc	2 024 192	1 910 512
Tubing and Pipe	1 186 740	1 111 138
Wire Rods	174 478	196 720
Wire and Products of Wire	1 432 182	1 629 717
Sheets (Black and Galvanized) and Tin Plate	1 280 537	1 508 607
Finished Structural Work	652 363	599 301
Angle Splice Bars and All Other Rail Joints	256 676	192 488
Spikes, Bolts, Nuts and Rivets	86 465	83 426
Axles	159 075	142 367
Steel Car Wheels	93 375	65 931
Sundry Steel and Iron Products	152 064	130 408
Total	12 374 838	12 506 619
Spelter	30 424	31 318
Sulphate of Iron	33 829	35 215
	Bbls.	*Bbls.*
Universal Portland Cement	11 197 000	10 114 500

COMPARATIVE PRODUCTION FOR 1913 AND 1912

construction as above described and for mine stripping operations.

During the year a total of $16,807,366 of bonds, mortgages and purchase money obligations of the Corporation and the subsidiary companies was paid off. Of this total $8,342,000 were redeemed through the sinking funds of the mortgages securing the bonds retired.

Bonds of subsidiary companies (largely car trusts) in the amount of $375,000 were issued and sold during the year for account of outlays made for additions and betterments. There was also assumed a real estate mortgage of $2,367 in connection with the acquirement of a small tract of coal.

Wages Higher

The average number of employes in the service of the Corporation and its subsidiary companies during the entire year 1913 was 228,906, as compared with 221,025 in 1912, an increase of 3.57 per cent. The aggregate amount of the pay rolls for 1913, for all employes, was $207,206,176, in comparison with $189,351,602 for the preceding year, an increase of 9.43 per cent. The totals, both in respect of number of employes and aggregate pay roll, were the largest in the Corporation's history. The relative percentages of increase, viz.: 3.57 per cent in number of employes and 9.43 per cent in total pay roll, reflect the general advance in wages and salaries made to the larger proportion of the employes on Feb. 1, 1913, to which reference was made in last year's annual report. This advance affected about 75 per cent of the employes, the 25 per cent not affected being the higher paid wage earners and salaried employes. The increase was about 12½ per cent in the case of employes receiving less than $2 per day, and graduating downwards from this percentage in respect of those receiving higher rates per day. The average increase in the entire pay roll (including both employes whose rates of pay were and were not affected) arising from this advance in wages and salaries, was 6 per cent, and the increased amount paid employes during 1913 because of this advance was approximately $12,000,000.

During the year there was disbursed by the trustees of the United States Steel and Carnegie Pension Fund the sum of $466,194.68. At the close of 1913 there were 2,092 on the pension rolls.

At Dec. 31, 1913, there were set aside from accumulated surplus of the Corporation an additional $500,000 for permanent pension fund reserve, making a total of $2,500,000 to the credit of the fund at the close of the year. The total amount (including the foregoing $2,500,000) to be supplied by the Corporation as principal for this fund is $8,000,000, at the rate of $500,000 annually.

Good Profits

Of Canadian General Electric Co. last year

Toronto, March 24.—The annual statement of the Canadian General Electric Co. for 1913 shows gross profits of $2,029,898, as compared with $2,011,719 for 1912. The sum of $470,933 was applied to depreciation and $222,654 to interest, leaving the net profits at $1,336,309, of which dividends and bonus took $776,634. The sum of $328,134 was added to the reserve fund and $231,541 to the credit of profit and loss, bringing the balance up to $913,932. The reserve fund now amounts to $2,700,000.

The annual report of the Hydro-Electric Power Commission of Ontario shows a total expenditure up to the end of 1913 of $5,915,724, of which $5,190,858 was spent on the Niagara system of transformer station and transmission lines. The commission has 357 miles of lines complete and 198 miles under construction. The expenditure during 1913 was $1,333,408. There are now 45 municipalities receiving power from the commission, at a total annual expense of $1,991,043, of which $1,511,048 represents operating and maintenance expenses. The total revenue to the municipalities was $2,611,918, and after allowing for depreciation, there remains a net profit for the year of $390,395.

The Canadian government has awarded a contract to the Canadian Vickers Co., of Montreal, for the construction of an ice-breaker, to cost $998,583, to be operated on the St. Lawrence to advance the opening of navigation. The ice breaker which will be the largest and most powerful in the world, was designed by Charles Duquid, government naval architect, and will be 275 feet long, 56½ feet wide and 36 feet deep, with 8,000 indicated horsepower.

Convention Date Changed

The National Metal Trades Association has changed the date for its annual meeting at Worcester, Mass., from April 22 and 23 to April 21 and 22. This is to allow members who are affiliated with the Machine Tool Builders' Association to attend the annual meeting of the latter in New York City, April 23 and 24.

Western Scrap Dealers Organize

Organization of the Western Scrap Iron and Steel Association has been completed and a membership in excess of 50 has been listed. The officers are as follows: President, D. R. Cohen; vice presidents, J. L. Lieberman, Samuel Lanski, Hyman Cohen, Louis Paper, A. Weber, L. I. Bregman, James S. Miller; Secretary, Burton L. Verner; treasurer, R. T. Rolfe.

Directors:—J. Singer, M. L. Fox, L. J. Borinstein, B. Colitz, Herman Sonken, Abe Feinberg and Fred Meyer.

The purpose of the organization, as stated in the constitution, is to meet socially, promote a more friendly feeling, discuss subjects of interest to the trade, promote the interests of the scrap iron business, co-operate for the improvement of conditions relative to the business, establish uniformity of customs and usages and foster a frank and friendly intercourse among its members.

The principal aim is to do away with certain abuses in the trade which have had a detrimental effect and which apparently could not be done away with except by united action.

An annual meeting is to be held in January and quarterly meetings in April, July and October, with special meetings called on request of members.

Provision is made for arbitration of differences between members of the organization which they are unable to adjust satisfactorily, an arbitration committee, three members of the organization, being provided to this end.

This organization is affiliated with those formed at Pittsburgh and Philadelphia.

Form New Iron Firm

Oliver Gee and S. C. Ludwig have formed the firm of the Gee & Ludwig Co., Philadelphia, for the sale of pig iron, coke, coal and iron and steel products generally. Offices have been opened at No. 1107 Harrison building. Both Mr. Gee and Mr. Ludwig have a wide acquaintance in the eastern Pennsylvania iron and steel trade. Mr. Gee was associated with Geo. T. Barnes & Co., Philadelphia, for 14 years, and for the past 11 years has been connected with the Philadelphia office of Matthew Addy & Co. Mr. Ludwig was in the employ of the Alan Wood Iron & Steel Co. for 11 years, and for nearly four years past also has been connected with Matthew Addy & Co., at Philadelphia.

TIPS FOR NEW BUSINESS

Equipment needs of the Iron and Steel works, Machine shops, Foundries and other Metal Working plants

I New York, the machinery business shows no improvement in actual sales over recent weeks. There is some improvement, however, in sentiment as a result of news from Washington offering encouragement to hope of favorable action on the railroad rate question. Little in the way of expansion in orders is expected until that matter is disposed of, or some clear idea is given of what action will ultimately be taken. Local houses are informed that many railroad and industrial corporations have everything in readiness for putting out inquiries for equipment in case permission for encreasing rates is granted. One of the large local automobile specialty manufacturing concerns has closed for a few machine tools recently. It is understood that there is some more business to be placed by this interest during the next week or two. The general opinion is that March will be well below the two preceding months in the aggregate of orders taken.

In Pittsburgh, there is no material change in the market for machine tools; consumers continue to defer closing transactions, although inquiries are coming out in fair volume. The first three weeks of this month do not compare favorably with the corresponding period in February, during which a number of attractive orders were placed. Builders of heavy rolling mill machinery complain about the lack of activity.

In Chicago, no change has taken place in the demand for machine tools, although several large equipments are in prospect. Inquiry is at a low ebb and aside from occasional sales for single tools or small lots, the market is quiet.

In Cincinnati, radial drills have been the best sellers during March, but sales have been mostly for single tools or very small lots. Business done in machine tools throughout the present month will be slightly in excess of January and February, but it is still very disappointing and the market is extremely sluggish. The few transactions that are being made are about equally divided between foreign and domestic trade. Dealers almost unanimously declare that the effects of the tariff act passed by congress last fall are beginning to be felt. Special machinery is slower, but makers are busy on old orders. Small electrical equipment is medium, having slumped slightly since the first of the year. Second-hand machinery is slow.

EASTERN STATES

AUGUSTA, ME.—Continental Engineering Co. has been incorporated; all kinds of motors; $1,000,000; by E. M. L. Leavitt, Augusta, president and treasurer.

PORTLAND, ME.—Bourne Insulated Wire & Cable Co. has been incorporated; insulated wires and cables and all allied products; $150,000; by J. H. Pierce, Portland, president; S. W. Bourne, treasurer.

PORTLAND, ME.—Acme Register Co. has been incorporated; electrical devices or machines for registering, signalling, etc.; $500,000; by R. A. Worth, president; E. C. Keith, treasurer, Portland.

BOSTON.—Kilgore Motor Starters Co. has been incorporated; $15,000; by Charles D. McCardy, Frederick O. Kilgore, Augustine J. Daly, Mary E. Daly.

BOSTON.—Orcutt Automatic Train Control Co. has been incorporated; $50,000; by F. A. Maddox, Medford; H. J. Savory, Somerville; L. E. Baldwin, Boston.

CAMBRIDGE, MASS.—The Church Hydroplane & Motor Co. has been incorporated; $100,000; by James E. Church, Samuel W. Pill, Louis Levy.

BRIDGEPORT, CONN.—Bead Chain Mfg. Co. has been incorporated; chains for lighting fixtures; $50,000; by Waldo C. Bryant, Gilbert W. Goodridge and David S. Day, all of Bridgeport.

FAIRFIELD, CONN.—Wood Mfg. Co. has been incorporated; $50,000; by Wm. B. Boardman, Grace L. Watt, George E. Hill, all of Hartford, Conn.

GROTON, CONN.—N. F. Ball Pattern Co. has been incorporated; $50,000; by N. F. Ball, H. W. Schreiner, A. T. Graves, all of Groton.

BUFFALO.—D'Arcy Mfg. Co. has been incorporated; foundry and machine shop; $25,000; by C. A. Yearke, J. C. Yearke, C. F. Yearke, Buffalo.

BUFFALO.—Ampere Control Corporation has been incorporated to deal in control systems for autos, aeroplanes, etc.; $100,000; by Ernest W. Jones, Ralph E. Heard, L. C. Kinnius.

LONG ISLAND CITY, N. Y.—The Atlantic Macaroni Co., Vernon and Englis streets, will erect a three-story brick factory to cost about $30,000.

LONG ISLAND CITY, N. Y.—The General Vehicle Co. has plans under way for building an addition to its plant on Fox street, estimated to cost $500,000.

LONG ISLAND CITY, N. Y.—The National Casket Co. will construct a six-story concrete factory on Jackson avenue. The plans are being prepared by Ballinger & Perrot, 1328 Broadway, New York, and it is expected that bids will be requested April 15.

NEW YORK.—Ariston Fire Escape Mfg. Co. has been incorporated; $130,000; by Maurice Kleiner, G. H. and F. W. Rice, 58 Sullivan street, Brooklyn.

NEW YORK CITY.—George Giovanna Co. has been incorporated; broiling machines, ovens; $10,000; by F. E. Guislin, Aug. Rabbino, Geo. Giovanna, 149 West Twenty-eighth street.

NEW YORK.—The New York Telephone Co. has filed plans for seven additional stories to be added to its building at 18 to 24 Lispenard street. McKenzie, Voorhees & Guillin are the architects. It is estimated that the addition will cost $500,000.

NEW YORK—The Turner Construction Co., 11 Broadway, has been awarded the contract for erecting the plant for Rock Plaster Mfg. Co., at 150th street and East river. The plans call for a four-story mill, 80 x 122 feet, one-story engine building, 80 x 52 feet, and a one-story storage building, 27 x 50 feet, all to be of reinforced concrete construction.

NORTH PELHAM, N. Y.—Sartiron Utilities Mfg. Co., Inc., has been incorporated to manufacture electric and pressing irons; $100,000; by M. C. Downs, H. D. Downs, L. B. May, all of New York City.

PULASKI, N. Y.—The Niagara, Lockport & Ontario Power Co. will erect a power plant on the Salmon river near here.

ROCHESTER, N. Y.—The Stanwear Mfg. Co. has been incorporated; machinery and metal specialties; $30,000; by H. V. Askarigan, A. M. Ballarian, F. B. Taylor, Rochester.

SCHUYLERVILLE, N. Y.—John N. Carlisle, engineer, 59 Lancaster street, Albany, N. Y., will take bids in the spring for a steel bridge over the Hudson river, 600 feet long, 16 feet wide, three spans. Abutments and piers will be reinforced concrete.

CONNELLSVILLE, PA.—Pittsburgh interests are understood to be negotiating for the Lavenia coke plant of W. H. Cochran and J. S. Laughrey.

CONNELLSVILLE, PA. — The Snowden Coke Co., which operates the Mount Hope plant, is building 150 new ovens, which will

double capacity. Ovens are of the Mitchell rectangular type, with box doors.

CONNELLSVILLE, PA. — The Allegheny Coke Co., successor to the Mitchell Coke Co., contemplates doubling capacity this year. The plant will consist of 300 ovens, when completed.

DOYLESTOWN, PA.—Doylestown Agricultural Works will be rebuilt; cost, $15,000; W. H. Kinderson, architect, Doylestown.

ERIE, PA.—Alteration in the Griffin Mfg. Co.'s hardware supplies plant, will cost about $1,000.

ERIE, PA.—Erie Scrap Iron Co. will ask to be incorporated April 3, to buy and sell iron; organizers, H. T. Mentzer, Sol Emmerman, Phillip Himels.

ERIE, PA.—Engineer George H. Kimball, of Detroit, upon consultation, has advised the erection of a new union railway passenger station near the location of the present station;; estimated cost, $1,200,000.

ERIE, PA.—Several Erie manufacturing companies are planning a fund of $100,000 to $150,000, to erect industrial homes for workingmen. D. W. Harper is chairman of the Erie Board of Trade committee making investigations of housing systems.

NORRISTOWN, PA.—Gas & Electric Co. will erect a 1-story, 50 x 64-foot power house; bids March 30; J. A. Crisfield, engineer.

OIL CITY, PA.—The Dresser Engine & Foundry Co. has been incorporated at Dover, Del., for the manufacture of engines, compressors and castings of all kinds; capital, $300,000; incorporators, Richard S. Lyman, Richard P. Morgan, Oil City; Robert A. Dresser, Bradford, Pa.

PHILADELPHIA. — The Harold McCalla Co. has been incorporated to sell iron, steel, zinc, etc.; $100,000; by Harold McCalla, W. C. Hulzberger, Garner McCalla, Edwin H. Mayhew, C. R. Wannemacher.

PHILADELPHIA. — Schwarz Spring Co. has been incorporated; $10,000; by Henry Hess, Joseph H. Hinlein, Louis J. Kolb, G. F. Uber, Conrad P. Geissel, Robert Paul Sachs.

PITTSBURGH.—Witherow Steel Co. has been incorporated; construction forms; $25,000; by William Witherow, W. P. Witherow, William G. Watt, Pittsburgh.

PITTSBURGH.—The Pittsburgh Foundry & Machine Co. has purchased about 44,000 square feet of property fronting on Thirty-sixth street and the Allegheny river from the McCollough estate. It is understood a modern foundry will be erected.

SHARON, PA.—Sharon council is petitioning the county commission for a new State street bridge.

SHARON, PA.—The Petroleum Iron Works Co. is building an extension to its power plant building to provide for the installation of air compressors.

WASHINGTON, PA.—The Bessemer Coke Co. soon will award contracts for putting down a shaft and erecting coal tipples near Lone Pine, about eight miles from here. The company acquired title to coal land in the Lone Pine section early in the year.

DELAWANNA, N. J.—The J. H. Mead Co., manufacturer of gas accessories, has bought a site here for a plant to be erected soon.

PATERSON, N. J.—Riverside Machine & Welding Co. has been incorporated to manufacture textile and other machinery; $50,000; by John Rooney, John J. Fisher, Paterson; Mabel E. Bennet, Clifton.

WASHINGTON.—Bids will be received until 10:30 a. m., March 25, by Major F. C. Boggs at the general purchasing offices for sheet, steel and iron, etc., under canal circular No. 833.

CENTRAL STATES

CHILLICOTHE, O. — Glenn L. Perry, county engineer, will take bids April 15 for a steel bridge, 800 feet span, over the Scioto river, to cost about $100,000.

CINCINNATI.—Fire recently destroyed the plant of the Andrew Messmer Co., Cincinnati, manufacturer of ornamental work, involving a loss of $60,000. Insurance carried by the company amounts to about $30,000.

CLEVELAND.—The Cleveland Tap & Tool Co. has been incorporated to manufacture and deal in metal working tools; $25,000; by H. J. McGivern, J. T. Cassidy, Albert Bruck, et al.

CLEVELAND.—The Apex Pattern Co. has been incorporated to manufacture and deal in patterns; $5,000; by Glen P. Gowan, R. E. Campbell, P. B. Zimmerman, C. P. McIntosh and John M. Bell.

COLUMBUS, O.—State utilities commission has authorized a $70,000 mortgage bond issue by the Lake Shore Electric railroad for improvements. The Northern Ohio Traction & Light Co. asks permission to issue and sell $481,000 preferred stock for extensions and improvements. The Painesville & Eastern wants permission to issue $54,000 in gold bonds.

COLUMBUS, O.—F. M. Sayre, county auditor, will open bids April 10 for approaches and superstructure to the Shadeville bridge, Hamilton township, west approach to Blenden bridge, Blenden township; south approach to Rees bridge, Hamilton township; blue prints for $1 from county surveyor; certified check for $500 on Shadeville bridge and for $200 on the others.

DAYTON, O.—The Z. N. Mfg. Co., Dayton, O., has taken out articles of incorporation to manufacture and deal in iron and steel products. Among the incorporators are Bernard Ziehler, Fred C. Nickel and Sol Flatau.

ELYRIA, O.—The Garford Mfg. Co. has been incorporated to manufacture general machinery and electrical supplies; $1,300,000; by A. L. Garford, John H. Watson Jr., John T. Scott, H. H. Johnson, B. E. Robertson.

HURON, O.—Commissioners have authorized a flood emergency loan of $19,000 for repairing bridges in the county damaged by last year's floods.

IRONTON, O.—Marting Iron & Steel Co. has increased its capital stock from $2,000,000 to $2,350,000.

LANCASTER, O.—The Midgely Tire & Rubber Factory, capital, $100,000, will locate here. The company is trying to buy the Flint glass plant, which is for sale at $25,000.

LIMA, O.—The Detroit, Toledo & Ironton railroad plans to place combination electric and gasoline cars on the section between here and Ironton. Superintendent J. H. Fraser says much new rolling stock will be purchased and heavy rails laid.

MADISON, O.—The Wm. Edwards Co., of Cleveland, will erect a canning factory on a 12-acre site near here.

PLEASANT HILL, O.—Business men are organizing an electric lighting company to erect an electric light plant here; N. B. Teeter, N. W. Powell, John Myers, et al., are interested.

SANDUSKY, O.—Bids will be received until noon March 31 by J. J. Molter, director of public service, for 3,000 linear feet of 6-inch, 1,000 feet of 8-inch, 1,000 feet of 10-inch and 3,000 feet of 12-inch standard or heavy weight cast iron pipe and 10 tons of cast iron fittings.

SPRINGFIELD, O.—Clark county will issue $42,000 bonds for repair and reconstruction on 115 bridges; S. Van Bird, county surveyor.

SPRINGFIELD, O.—D., T. & I. railroad will buy much equipment for the road; all bridges will be rebuilt and heavy rails laid; estimated cost, $1,000,000.

WOOSTER, O.—The Massillon Electric & Gas Co. has a temporary injunction to stop the erection of a municipal plant at Orville. The company recently laid a $25,000 pipe line to Orville and complains that no attempt has been made to buy its plant.

YOUNGSTOWN, O.—The Petroleum Iron Works Co. is building an addition to its power plant to provide for installing compressors.

YOUNGSTOWN, O.—Placing the wires of the Consolidated Gas & Electric Co. on Federal street underground will cost $75,000. Only wires used for carrying lighting current will be put under the surface at present; later all wires will be run underground.

ZANESVILLE, O.—The war department having approved plans for Sixth street bridge, bids will be received immediately.

PARKERSBURG, W. VA.——Parkersburg Corrugated Paper Co. has been incorporated to make paper boxes; 50,000; by S. W. Goff, F. C. Goff, E. M. Utterback, W. F. Goff, James McCluer, all of Parkersburg.

PARKERSBURG, W. VA.—Herman Laub, engineer, Keystone building, Pittsburgh, will take bids about April 10 for a steel bridge over the Ohio river to cost $500,000. It will be a suspension bridge, 3,000 feet long, 40 feet wide and 775 feet channel span.

HOPKINSVILLE, KY.—The Ellis Coal & Ice Co. is making improvements to and extending its present plant and will during the summer erect a cold storage plant. A set of boilers, 250-horsepower, tubular type, will be installed; 500 horsepower will be developed.

LOUISVILLE. — The Louisville Machine Co. has increased its capital stock from $10,000 to $25,000.

OAKDALE, KY.—Bids will be received until April 7 for installing 10 or less standard fire hydrants and four or less standard fire cisterns. Address J. L. O'Neill, city clerk, R. F. D. 22, Box 324, Louisville, Ky.

FORT WAYNE, IND.—Work will begin at once on the proposed plant of the Diester Machine Co. on East Wayne street, adjoining the Nickel Plate tracks; a small power house will be erected later.

FORT WAYNE, IND.—Bids will be received until non March 24 by board of public works for turbo-generator set, exciter, condenser and switchboard; Indiana Engineering & Construction Co., consulting engineer.

INDIANAPOLIS.—Mayor Joseph E. Bell has plans and specifications for the proposed street lighting system; the city's contract with the lighting company expires next year, but bids will be received now on equipment.

INDIANAPOLIS.—The public service commission has authorized a $500,000 bond issue by the Indiana Fuel & Light Co. operating plants at Kendalville, Auburn and Garrett; $75,000 to be used for extensions, $200,000 to retire outstanding bonds and the remainder to be used as needed.

INDIANAPOLIS.—The American Valve & Tank Co. has filed articles of incorporation with a capital stock of $100,000, to manufacture water valves, flush valves, flush tanks and other bath appliances. The directors are Frank Shellhouse, William N. Frazee, Wm. J. Henley, Charles A. Wulp and John L. Baker.

CHICAGO.—J. Jurgenson, 3473 Armitage avenue, manufacturer of metal specialties, is to build a brick factory, about $3,000.

CHICAGO.—The Railway Material Co., 37 West Van Buren street, is to establish a factory for producing brake shoes at Stevens Point, Wis.

CHICAGO.—The Krause Forging Co. has been incorporated to manufacture steam and die forgings; $15,000; by T. F. Tansey; A. A. Winter, Oak Park, Ill., and Geo. W. Nilsson, 800 Laurel street, Austin.

CHICAGO.—Central Screw Co. has been in-

corporated to manufacture and deal in valves, screws, bolts; $25,000; by H. F. Kellogg, O. M. Dennis, F. M. Kinsley.

CHICAGO.—The American Metal Form Co. is being organized with a capital of $2,500; by Ray G. Owens, Samuel J. Cogan and W. P. Cunningham, 37 West Van Buren street.

CHICAGO.—Robert E. Berlin, 19 South La Salle street, is drawing plans for a Y. M. C. A. hotel, 18 stories, 96 x 166 feet, brick and steel construction.

CHICAGO.—A. W. Buckley & Co., 3969 Elston avenue, is revising plans for a warehouse and factory building, five stories, 175 x 220 feet, reinforced concrete.

CHICAGO.—Wm. H. Spear Co. has taken out incorporation papers, to manufacture and deal in railway, automobile and agricultural implements and supplies; by Wm. H. Spear, 68 West Monroe street, and H. C. Perrine.

CHICAGO.—The Rollins Steam Specialty & Valve Co. is being organized with a capital of $25,000; by C. P. Rathbun, E. W. Ashcraft and E. M. Ashcraft Jr., 108 South La Salle street.

CHICAGO.—The Griffin Car Wheel Co., McCormick building, has bought 15 acres at Vernon, Cal., on which to build a plant for manufacturing car wheels, to cost about $500,000.

SPRINGFIELD, ILL. — The American Wrench & Bolt Machine Co., capital, $100,000, is negotiating for a 1-acre site in East Springfield. The management announces that a plant for making molding devices will be erected soon.

STERLING, ILL.—The Frantz Mfg. Co., maker of light building hardware, is asking bids on the first unit of its proposed plant to be built on Locust and Wallace streets.

WESTFIELD, ILL.—Bids will be received until March 26 by the village board for 5,400 feet of 6-inch, 114 feet of 4-inch cast iron water pipe, 3,980 pounds of specials, 11 fire hydrants and eight 6-inch valves; W. Robert Paige, Terre Haute, Ind., engineer.

ALMA, MICH.—Tinny Combination Water & Coal Gas Type Co. has been organized and will spend about $100,000 for an artificial gas plant, contracts for which have been let; but the contract for 35 miles of pipe has not been awarded. C. I. Tinny, H. B. Wagner, of Grand Rapids, and Charles F. Brown, Alma, are interested.

DETROIT.—The Accessory Forging Co., a new incorporation, is to erect a shop for the manufacture of automobile forgings. Fred H. Bahr, Butler building, may be addressed.

GRAND RAPIDS, MICH.—City will vote April 6 on a $138,000 bond issue for the proposed Pearl street bridge.

GRAND RAPIDS, MICH.—The Wolverine Brass Works will remodel its 2-story brick block at 621 Monroe street.

BELOIT, WIS.—The Williams Engine & Clutch Co., of Detroit, has filed articles of dissolution of the corporation. C. H. Morse Jr., was president and chief owner.

FOND DU LAC, WIS.—Keller Pneumatic Tool Co. has been incorporated; $100,000; by Julius Keller, Clara Keller, F. J. Rueping; T. L. Doyle, attorney.

GRAND RAPIDS, WIS. — The Weinberg Construction Co. will build an interior finish and building woodwork plant at West Grand Rapids, to cost $25,000. The construction work will be handled direct by the owners. Equipment, including hydro-electric and woodworking machinery, is now being purchased.

MADISON, WIS. — The Scotch Oil Co., capital $10,000, has been organized by H. C. Smith and A. I. McCullom, of Madison, to manufacture and market petroleum products. For the present, the concern will carry on operations in the Jefferson Transfer Co. warehouse on West Main street, where equipment for refining, blending and preparing oils and oil products is being installed. Later the concern expects to build its own plant and storage.

MILWAUKEE. — The Milwaukee Grinder & Specialties Co., Twenty-second and Sycamore streets, is having plans prepared by Klug & Smith, Mack building, for a shop 90 x 120 feet.

MILWAUKEE.—The Wisconsin Welding & Cutting Co. has been organized here to engage in general boiler, machinery and automobile repair work. A shop has been established at 165 Barclay street.

MILWAUKEE.—The Nunn & Bush Shoe Co., occupying two floors in the Dial Cash Register building at 409-419 Third street, Milwaukee, is preparing to build its own shops. The capital has been increased from $100,000 to $300,000. Plans are being made for a six-story main building, 50 x 140 feet in size, with a 35 x 40-foot wing for power plant and heating system. The capacity will be from 2,500 to 3,000 pairs of work shoes daily. Henry L. Nunn is manager.

PLYMOUTH, WIS.—The Plymouth Foundry & Machine Co. is to build an addition to its foundry and machine shop.

SHEBOYGAN, WIS. — Plans are being prepared by W. C. Weeks, architect, for a 4-story addition to the Hotel Foeste, Sheboygan. It will be 39 x 70 feet in size, affording 28 rooms with individual baths and steam heat.

STEVENS POINT, WIS. — The Railway Materials Co., Chicago, has started work on remodeling the former Wisconsin Central railroad shops here into a brake shoe foundry and expects to be able to begin operations April 1. Equipment has been ordered and will be installed as soon as possible. A contract has been made with the Stevens Point Light & Power Co. for the supply of current for motor drive throughout. The shops have been idle more than ten years.

ST. LOUIS.—Bids will be received until noon March 31 for constructing head house, chimney, pumps, boilers, pining and appurtenances; address E. R. Kinsey.

DAVENPORT, IA.—The Standard Oil Co. will spend $100,000 here during the coming year on the following buildings: Fireproof barn and garage, two stories, 60 x 80 feet; office building, 2-story brick and concrete, 50 x 60 feet; warehouse, 2-story brick and concrete, 87 x 124 feet, 14-foot basement.

RED OAK, IA.—Kerrihard Co. has begun construction on the 70 x 90-foot addition to its factory; special machinery for making steel tanks will be installed.

BEMIDJI, MINN.—The Bemidji saw mill, damaged by fire March 5, is being rebuilt; estimated cost, $100,000; Crookston Lumber Co., owner.

BIND ISLAND, MINN.—Renville County Electric Co. will extend and improve its plant; Mr. Rutledge, president.

MINNEAPOLIS.—Northwest Compo Board Co. will build a $50,000 plant and warehouse of fireproof reinforced concrete with wire glass windows and metal frames.

SOUTHERN STATES

RICHMOND, VA.—Bids will be received by E. E. Davis, superintendent of waterworks, for gate valves, cast iron pipe, etc.

LUMBERTON, N. C. — Robeson county will construct a double track steel bridge across Lumber river; plans by Virginia Bridge & Iron Co., Roanoke, Va.; address bids to A. J. Floyd until April 6.

MOORESVILLE, N. C.—Bids will be received until 2 p. m. March 27 by the town commissioners for four miles of water mains, valves, hydrants, etc.; Adlai Osborne, Charlotte, N. C., engineer.

WILSON, N. C.—City will receive bids until March 31 for improvements to the power plant, to include pipe lines, centrifugal pumps and cooling system; also install water tube boilers, 2,500-kilowatt engine or turbine-driven generator units, condensers and switchboard; address T. A. Hinnant, city clerk.

METTER, GA.—Metter Co-operative Light & Power Co. has been incorporated; $20,000; by J. R. Dixon, W. J. Brown, B. G. Bowen, et al.

TYLERTOWN, LA.—T. C. Simmons and A. C. Boyd have bought the Tylertown Light & Power Co.'s plant; they expect to increase its facilities.

WACO, TEX.—The Magnolia Petroleum Co., of Houston, March 10 purchased eight lots fronting on the Cotton Belt railroad. Work will begin immediately on a $20,000 plant to consist of steel tanks and warehouses.

WESTERN STATES

KANSAS CITY, KAN.—The West Side Foundry Co. is making arrangements to lease a site at the foot of Nebraska avenue on the levee where it will build a malleable iron foundry. George Bemarkt is manager.

CHEHALIS, WASH. — Ambrose-Burdsall, Portland, Ore., has been awarded a contract at $13,488 for a steel bridge at Riverside, Cal.

MT. VERNON, WASH.—Northwest Traction Co. has asked permission to extend its electric lines on all roads in Skagit county; L. R. Coffin, manager.

KLAMATH FALLS, ORE.—Keno Power Co. has been incorporated; $250,000; by J. W. Kerns, et al.; it plans to enlarge its plant and operate in this city if the council grants a franchise.

PORTLAND, ORE.—G. B. Hegardt, dock commission engineer, will receive bids soon for five electric winches, $2,100 each; rotary transformer, $2,500; and other electrical equipment for handling cargoes and sorting goods.

SACRAMENTO, CAL.—The state highway commissioner will ask bids shortly for a trestle across the Sacramento by-pass. It will be 16,000 feet long and 13,700 feet will be reinforced concrete with two draw bridges each 80 feet wide. The cost is estimated at $450,000.

SAN FRANCISCO. — The Union Iron Works is to build a one-story reinforced concrete machine shop to cost about $20,000. John MacGreggor, president.

TONOPAH, NEV.—Colorado River Hydro-Electric Co. has been incorporated; $5,000,000; by Henry C. Smidt, W. R. Williams and William Forman. The company has secured valuable water rights on Colorado river near the Nevada line.

NEW CATALOGS

REAMERS AND DRIFTED PIPE. — The National Tube Co., Pittsburgh, has issued a 12-page bulletin containing a complete description of reamed and drifted pipe, together with a short introduction explaining the process of well drilling.

PICKLING MACHINES. — An eight-page bulletin recently issued by the Mesta Machine Co., Pittsburgh, is devoted to its improved type pickling machine described in THE IRON TRADE REVIEW, Nov. 20, 1913. Various views of this machine are included, as well as a cross-section showing the method of imbedding the base casting in concrete.

CRANES.—A 40-page bulletin recently issued by the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., is devoted to this company's extensive line of traveling cranes. In addition to detailed descriptions of the cranes and their appurtenances, including trolleys, trucks, controllers, etc., a large number of service views are included, which clearly illustrate the adaptability of the handling equipment built by this company.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(First half delivery.)

Bessemer, valley	$14.25
Bessemer, Pittsburgh	15.15
Basic, Pittsburgh	13.90 to 14.15
Basic, Philadelphia	14.00 to 14.50
Malleable, Pittsburgh	14.15 to 14.40
Malleable, Chicago	14.25
Malleable, Philadelphia	15.25 to 15.50
Malleable Buffalo	14.00 to 14.50
No. 1X Philadelphia	15.25 to 15.50
No. 2 foundry, Pittsburgh	14.15 to 14.40
No. 2 foundry, Cleveland	14.00 to 14.25
No. 2 foundry, Ironton	13.50
No. 2 foundry, Chicago	14.25
No. 2X foundry, Philadelphia	14.90 to 15.25
No. 2X foundry, New York	14.75 to 15.25
No. 2X foundry, Buffalo	14.00 to 14.25
No. 2 plain, Philadelphia	14.50 to 14.75
No. 2 plain, New York	14.50 to 14.75
No. 2 plain, Buffalo	13.75
No. 2 southern, Birmingham	11.00 to 11.50
No. 2 southern, Cincinnati	14.00 to 14.25
No. 2 southern, Chicago	15.35 to 15.85
No. 2 southern, Philadelphia	14.75 to 15.00
No. 2 southern, Cleveland	15.00 to 15.35
No. 2 southern, New York	14.75 to 15.25
No. 2 southern, St. Louis	14.50 to 15.00
Virginia, 2X, Philadelphia	15.55 to 15.80
Virginia, 2X, New York	15.85 to 16.10
Gray forge (eastern Pa.)	13.90 to 14.25
Gray forge, Pittsburgh	13.65 to 13.90
Gray forge, Birmingham	10.25 to 10.75
Silveries, 5 per cent, Cleveland	17.30 to 17.55
Silveries, 5 per cent, Birmingham	12.50
Silveries, 5 per cent, Chicago	16.85
Silveries, Jackson co., 8 per cent	15.75 to 16.00
Standard low phos., Phila	21.00
Lebanon low phos., furnace	17.00 to 17.50
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.50 to 16.50
Charcoal, Buffalo	16.00 to 17.00
Charcoal, Birmingham	25.00
Middlesbrough, No. 3, Phila., ex ship	15.00 to 15.25

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent	$4.40
Mesabi Bessemer, 51½ per cent	4.15
Old range, non-Bes., 55 per cent	3.60
Mesabi, non-Bessemer, 51½ per cent	3.40

(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent	7 to 8c
Foreign non-Bess., 50 to 65 per cent.	7 to 8c

COKE

(At the ovens.)

Connellsville furnace	$2.00
Connellsville fur. contr.	2.00 to 2.10
Connellsville foundry	2.40 to 2.65
Connellsville fdy., contr.	2.50 to 2.75
Wise county furnace	1.90 to 2.10
Wise county foundry	2.50 to 3.10
Pocahontas furnace	2.15 to 2.40
Pocahontas foundry	2.50 to 2.75
New River, foundry	2.85 to 3.50
New River, furnace	2.50 to 2.75

FERRO-ALLOYS

Ferro-manganese, Baltimore	$38.00 to 40.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent, Pgh.	22.90
Ferro-sil., 11 to 12 per cent, Pgh.	21.90
Ferro-sil., 10 to 11 per cent, Pgh.	20.90
Ferro-sil., 9 to 10 per cent, Pgh.	19.90
Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Bes. billets, Pgh. and Yn.	$21.00
Open-hearth bil., Pbgh. and Yn.	21.00
Open-hearth bil., Phila.	23.40 to 24.40
Op.-hearth sh. bars, Pbgh. & Yn.	22.00
Forging billets, Phila.	27.40 to 28.40
Forging billets, Pittsburgh	25.00 to 26.00
Wire rods, Pittsburgh	26.00 to 26.50
Bes. sheet bars, Pbgh. and Yn.	22.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Light rails, 8 lbs., Pbgh. or Chi.	1.40c
Lgt. rails, 12 lbs., Pbgh. or Chgo.	1.35c
Lgt. rails, 16 to 20 lb., Pbgh. or Chicago	1.30c
Lgt. rails, 25 to 45 lbs., Pbgh. or Chicago	1.25c
Relaying rails, standard, Chgo.	23.00 to 24.00
Relaying rails, light, Chicago	$21.50 to 22.50
Angle bars, st. sect. Pbgh., base	1.50c
Angle bars, st., sections, Chgo.	1.50c
Spikes, railroad, Pbgh.	1.45c to 1.50c
Spikes, railroad, Chgo.	1.55c
Track bolts, Pbgh.	2.00c
Track bolts, Chgo.	2.00c

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.20c to 1.25c
Structural shapes, Chicago	1.43c
Structural shapes, Philadelphia	1.30c to 1.40c
Structural shapes, New York	1.31c to 1.41c
Structural shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.38c to 1.43c
Tank plates, Pittsburgh	1.20c
Tank plates, Philadelphia	1.30c to 1.40c
Tank plates, New York	1.31c to 1.41c
Bars, soft steel, Pittsburgh	1.20c to 1.25c
Bars, soft steel, Chicago	1.38c to 1.43c
Bars, soft steel, Philadelphia	1.35c to 1.40c
Bars, soft steel, New York	1.36c to 1.41c
Shapes under 3 in., Pittsburgh.	1.30c to 1.35c

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Denver	84½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, plates and shapes	80 cents

Hoops, carloads, Pittsburgh	1.30c to 1.35c
Hoops, less carloads, Pittsburgh	1.45c to 1.50c
Bands, Pittsburgh	1.20c to 1.25c
Shafting, carloads, Pbgh., disc.	63 to 65
Shaft'g, less carl'ds, Pbgh., disc	58 to 60
Bar iron, Chicago	1.15c to 1.20c
Bar iron, Philadelphia	1.22½ to 1.32½c
Bar iron, New York	1.25c to 1.30c
Bar iron, Cleveland	1.20c to 1.25c
Bar iron, Pittsburgh	1.30c to 1.35c
Hard steel bars, Chicago	1.30c
Smooth finish'g mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.95c to 2.00c
No. 28, black, Chicago	2.13c to 2.18c
No. 28, tin mill, black, Pbgh.	1.90c to 1.95c
No. 28, galvanized, Pbgh.	2.95c to 3.00c
No. 28, galvanized, Chgo.	3.13c to 3.18c
No. 28, cor. galv., Pbgh.	3.05c to 3.10c
No. 28, painted cor., Pbgh.	2.15c to 2.20c
No. 10, blue annealed, Pbgh.	1.40c to 1.45c
No. 10, blue annealed, Phila.	1.55c to 1.60c
Tin plate, 100 lb., coke, base	$3.40

IRON AND STEEL PIPE

(Pittsburgh.)

	Black	Galv.
	Butt-weld.	
Steel, ⅜ to 3 inches	79½	71
Iron, ⅜ to 2½ inches	70	61
	Lap-weld.	
Steel, 2½ to 6 inches	79	70½

BOILER TUBES

Steel, 3½ to 4½ inches	71
Iron, 3½ to 4½ inches	60

WIRE PRODUCTS

Wire nails, jobbers, Pittsburgh	$1.60
Wire nails, retailers, Pittsburgh	1.65
Plain wire, jobbers, Pittsburgh	1.40
Plain wire, retailers, Pittsburgh	1.45
Galvanized wire, jobbers, Pbgh.	1.80
Galvanized wire, retailers, Pbgh.	1.85
Polished staples, Pbgh.	1.60
Galvanized staples, Pbgh.	2.00
Barb wire, painted, jobbers, Pbgh.	1.60
Barb wire, painted, retailers, Pbgh.	1.65
Barb wire, galv., retailers, Pbgh.	2.05
Barb wire, galv., jobbers, Pbgh.	2.00

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 80 and 2½; cut threads, 75 and 17½; larger and longer, 70 and 15.

Machine bolts and hot pressed nuts ⅜ x 4 inches, smaller and shorter, rolled, 80 and 7½; cut, 80 and 2½; larger and longer, 70, 10 and 10.

Gimlet and cone point lag or coach screws, 80 and 20.

Hot pressed square, blank and tapped nuts, $6.00 off list; hot pressed hexagon blank or tapped, $6.70.

Cold pressed, C. & T. square, blank, or tapped, $3.80 off; hexagon, blank or tapped, ⅝ inch and larger, $6.80; ½-inch and smaller, $7.40.

RIVETS

Structural rivets, Pbgh.	1.60c to 1.65c
Structural rivets, Chgo.	1.78c
Boiler rivets, Pbgh.	1.70c to 1.75c
Boiler rivets, Chgo.	1.88c

SCREWS

(New York.)

Lag, gimlet and cone point	80 and 20
Coach, gimlet point	80
Standard jack	70 and 10
Mch., cut thread, flat head	50 and 10
Mach., cut thread, round head	50 and 10 and 10
Mch., cut thread, fillister hd.	40 and 40 and 10
Mch., rolled thread, flat head or round head	80 and 10
Set screws, iron	75 and 10 and 10
Set screws, steel, per cent advance over iron	25
Square head cap screws	70 and 10 and 10
Hexagon head cap screws	70 and 10 and 10
Fillister head cap screws	60 and 10 and 10
Flat head wood screws	10 and 10 and 5
Round head wood screws	10 and 10 and 5

WASHERS

(Iron or steel, New York.)

⅛-inch	5.90c
3/16-inch	5.00c
¼-inch	3.90c
5/16-inch	3.70c
⅜-inch	3.60c

STEEL SHEET PILING

(New York.)

Base sizes	1.50c

TWISTED REINFORCING BARS

(Soft steel, Pittsburgh mill.)

¾-inch and larger	1.25c
5/8-inch	1.30c
½-inch	1.35c
3/8-inch	1.50c
¼-inch	1.75c

IRON AND STEEL PRICES

Corrected up to Tuesday noon

TACKS

(New York.)

	Discount.
American carpet tacks	90 and 20 and 10
American cut tacks	90 and 20 and 10
Railroad tacks	90 and 40
Gimp tacks	90 and 20 and 10
Finishing nails	70

WIRE ROPE

Galvanized, iron and steel	47½ and 2½
Bright, iron and steel	55 and 2½

TRIANGLE REINFORCING MESH

(Per 100 square feet f. o. b. mill, car loads.)

No. 4, plain	$1.00
No. 4, galvanized	1.12
No. 7, plain	.49
No. 7, galvanized	.55
No. 23, plain	1.69
No. 23, galvanized	1.88
No. 26, plain	1.17
No. 26, galvanized	1.30
No. 27, plain	.96
No. 27, galvanized	1.07
No. 31, plain	2.49
No. 31, galvanized	2.76
No. 35, plain	1.17c
No. 35, galvanized	1.30
No. 39, plain	3.05
No. 39, galvanized	3.38
No. 43, plain	1.10
No. 43, galvanized	1.23

SPIRAL RIVETED PIPE

(Per 100 linear feet, f. o. b. factory.)

4-inch, plain	$ 19.76
4-inch, galvanized	30.74
6-inch, plain	33.05
6-inch, galvanized	49.73
8-inch, plain	43.17
8-inch, galvanized	65.00
10-inch, plain	66.42
10-inch, galvanized	96.15
12-inch, plain	83.75
12-inch, galvanized	118.30
14-inch, plain	99.14
14-inch, galvanized	138.85
16-inch, plain	117.53
16-inch, galvanized	166.58
20-inch, plain	183.79
20-inch, galvanized	248.39
24-inch, plain	219.92
24-inch, galvanized	293.99
30-inch, plain	324.81
30-inch, galvanized	430.64

CAST IRON PIPE

Four-inch, water, Chicago	$26.50
Six to 12 inches, Chicago	24.50
Larger sizes, Chicago	24.00
Six inch, water, New York	$22.00 to 23.00
Four-inch, water, Birmingham	21.50
Six inch and larger, Birmingham	19.50

Gas pipe, $1 per ton higher than water.

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.75c to 1.90c
Steel bars, Philadelphia	1.80c
Steel bars, New York	1.90c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, Cincinnati	1.70c to 1.80c
Iron bars, Philadelphia	1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.85c to 2.00c
Shapes and plates, Philadelphia	1.80c
Shapes and plates, New York	1.95c
No. 10 blue ann. sheets, Chgo.	1.95c
No. 10 blue ann. sheets, Cleve.	2.15c
No. 10 blue ann. sheets, Cinci.	2.00c to 2.05c
No. 28 black sheets, Chgo	2.55c
No. 28 black sheets, Cleveland	2.60c
No. 28 black sheets, Cincinnati	2.50c to 2.55c
No. 28 galv. sheets, Chgo	3.60c
No. 28 galv. sheets, Cleveland	3.60c
No. 28 galv. sheets, Cincinnati	3.50c to 3.55c

IRON AND STEEL SCRAP

(Net tons.)

No. 1 railroad wrought, Chgo.	$ 8.75 to 9.25
No. 1 railroad wrought, Cleve.	9.50 to 10.00
No. 1 railroad wrought, Phgb.	11.00 to 11.50
No. 1 R. R. wght., eastern Pa.	14.00 to 14.50
No. 1 railroad wrought, St. L.	8.50 to 9.00
No. 1 railroad wrought, Cinci.	8.75 to 9.25
No. 1 railroad wrought, Buffalo	10.00 to 10.75
No. 2 railroad wrought, Chgo.	8.00 to 8.50
No. 2 railroad wrought, Pbgh.	10.50 to 11.00
No. 2 railroad wrought, sheet eastern Pa. (gross tons)	12.25 to 12.75
No. 2 railroad wrought, Buffalo	10.50 to 11.25
No. 2 railroad wrought, Cinci.	8.25 to 8.75
No. 2 railroad wrought, St. L.	8.25 to 8.50
Arch bars and transoms, Chgo.	12.00 to 12.50
Arch bars and transoms, St. L.	12.00 to 12.50
Knuckles, coup. and spr'gs, Chgo.	9.00 to 9.50
Knuckles, coup., and spg's, St. L.	9.75 to 10.25
Shafting, Chicago	11.50 to 12.00
Shafting, St. Louis	13.00 to 13.50
Steel car axles, Chgo	12.25 to 12.75
Steel car axles, eastern Pa., (gross tons)	15.50 to 16.00

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.65
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.65
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Richmond, Va.	2.94
Toledo	1.95
Valley furnaces	1.20

Steel car axles, Buffalo	14.25 to 14.75
Steel car axles, St. Louis	13.00 to 13.50
Locomotive tires, Chicago	10.00 to 10.50
Locomotive tires, St. Louis	9.50 to 10.00
Cut forge, Chicago	8.00 to 8.50
No. 1 forge, eastern Pa., gr. tons	9.50 to 10.00
Pipes and flues, Chicago	6.75 to 7.25
Pipes and flues, Eastern Pa., (gross tons)	10.50 to 11.00
Pipes and flues, Cleveland	8.00 to 8.50
Pipes and flues, St. Louis	7.00 to 7.50
No. 1 cast, Chicago	10.00 to 10.50
No. 1 cast, Pittsburgh	11.00 to 11.50
No. 1 cast eastern Pa. (gr. tons)	13.00 to 13.50
No. 1 cast, New Jersey points	12.50 to 12.75
No. 1 cast, Cleveland	10.75 to 11.00
No. 1 cast, Cincinnati	10.25 to 10.75
No. 1 cast, St. Louis	10.50 to 11.00
No. 1 busheling, Chicago	7.00 to 7.50
No. 1 busheling, Pittsburgh	9.25 to 9.75
No. 1 busheling, Cleveland	8.50 to 9.00
No. 1 busheling, Buffalo	8.00 to 8.50
No. 1 busheling, Cincinnati	6.50 to 7.00
No. 1 busheling, St. Louis	8.00 to 8.50
No. 2 busheling, Chicago	5.75 to 6.25
No. 2 busheling, Buffalo	5.75 to 6.25
No. 1 boiler plate, cut, Chgo.	6.50 to 7.00
No. 1 boiler plate, cut, Buffalo	9.00 to 9.50
No. 1 boiler plate, cut, St. L.	6.50 to 7.00
Boiler plate, Cleveland	7.50 to 8.00
Boiler punchings, Chicago	9.75 to 10.25
Cast borings, Chicago	4.75 to 5.25
Cast borings, Pittsburgh	7.50 to 8.00
Cast borings, east. Pa., gr. tons	8.50 to 9.00
Cast borings, Cleveland	6.00 to 6.50
Cast borings, Buffalo	5.50 to 6.00
Cast borings, Cincinnati	4.25 to 4.75
Cast borings, St. Louis	4.50 to 5.00
Machine shop turnings, Chgo.	4.75 to 5.25
Mch. shop turnings, Pbgh	7.50 to 8.00
Mach. shop turn'gs, eastern Pa., (gross tons)	8.00 to 8.50
Machine shop turnings, Cleve.	5.25 to 5.75
Machine shop turnings, Buffalo	5.25 to 5.75
Machine shop turnings, Cinci.	4.75 to 5.25
Machine shop turnings, St. L.	5.00 to 5.50
Malleable, agricultural, Chgo.	8.50 to 9.00
Mall., agricultural, Cleveland	8.00 to 8.50
Malleable, agricultural, St. Louis	8.00 to 8.50
Malleable, railroad, Chicago	9.75 to 10.25
Malleable, railroad, Pittsburgh	9.75 to 10.25
Mal., R. R., east. Pa., gross tons	9.00 to 9.50
Malleable, railroad, Cleveland	9.50 to 10.00
Malleable, railroad, Cincinnati	7.00 to 7.50
Malleable, railroad, St. Louis	8.50 to 9.00
Malleable, railroad, Buffalo	9.75 to 10.25
Angle bars, iron, Chgo	11.75 to 12.25
Angle bars, iron, St. Louis	10.50 to 11.00
Angle bars, steel, Chgo	8.50 to 9.00
Angle bars, steel, St. Louis	9.50 to 10.00
Stove plate, Chicago	9.00 to 9.50
Stove plate, Pittsburgh	8.50 to 9.00
Stove plate, east. Pa. (gr. tons)	9.25 to 9.75
Stove plate, Cleveland	8.25 to 8.75
Stove plate, Buffalo	9.75 to 10.00
Stove plate, Cincinnati	7.25 to 7.75
Stove plate, St. Louis	8.00 to 8.50
Bundled sheet, Pittsburgh	7.50 to 8.00
Bundled sheet, Cleveland	6.50 to 7.00
Bundled sheet, Cincinnati	5.00 to 5.50
Bundled sheet, Buffalo	5.50 to 6.00
Wrought iron pil'g plates, Clev.	13.00
Grate bars, Buffalo	8.50 to 9.00

(Gross Tons.)

Heavy melting steel, Pbgh.	$12.25 to 12.50
Heavy melting steel, Buffalo	10.00 to 10.50
Heavy melting steel, Chicago	9.25 to 9.75
Heavy melting steel, Cleveland	10.00 to 10.75
Heavy melting steel, Cincinnati	9.25 to 9.75
H'vy melting steel, eastern Pa.	11.25 to 11.50
Heavy melting steel, New York	9.00 to 9.25
Heavy melting steel, St. Louis	11.00 to 11.50
No. 1 R. R. wght., New York	11.50 to 12.00
Shafting, New York	12.75 to 13.00
Pipes and flues, New York	8.75 to 9.00
Mch. shop turnings, New York	6.25 to 6.50
Cast borings, New York	6.75 to 7.00
Stove plate, New York	7.50 to 7.75
Grate bars, New York	7.25 to 7.50
Shoveling steel, Chicago	9.00 to 9.50
Shoveling steel, St. Louis	9.00 to 9.50
Reroll'g rails, 5 ft. and ov., Pbgh.	13.50 to 14.00
Reroll. rails, 5 ft. and ov., Chgo.	11.25 to 11.75
Reroll. rails, 5 ft. and ov., Cleve.	11.75 to 12.25
Rerolling rails, 5 ft. and over, eastern Pa.	13.50 to 14.00
Reroll. rails, 5 ft. and ov., St. L.	12.00 to 12.50
Steel rails, short, Pittsburgh	13.00 to 13.50
Steel rails, short, Chicago	10.50 to 11.00
Steel rails, short, Cleveland	13.00 to 13.50
Steel rails, short, eastern Pa.	11.25 to 11.50
Steel rails, short, St. Louis	11.50 to 12.00
Iron rails, Pittsburgh	14.00
Iron rails, Cleveland	13.50 to 14.00
Iron rails, Cincinnati	11.00 to 11.50
Iron rails, eastern Pa	16.00 to 16.50
Iron rails, St. Louis	12.00 to 12.25
Frogs, switches, guards, Chgo.	9.75 to 10.25
Frogs, switches and g'rds, St. L.	11.00 to 11.50
Car wheels, Pittsburgh	12.50 to 13.00
Car wheels, Chicago	11.75 to 12.25
Car wheels, eastern Pa	12.25 to 12.75
Car wheels, Buffalo	12.00 to 12.50
Car wheels, N. J. points	13.00 to 13.50
Car wheels, St. Louis	11.25 to 11.75
Iron axles, Pittsburgh	23.00 to 23.50
Iron axles, Cincinnati	19.25 to 20.00
Iron axles, eastern Pa	21.00 to 22.00
Iron axles, Buffalo	21.50 to 22.00
Iron axles, Chicago	19.25 to 20.00
Steel car axles, New York	13.50 to 14.00
Steel car axles, Cleveland	16.50 to 17.00
Low phosphorus steel, Buffalo	15.00 to 15.50
Low phosphorus steel, Pbgh.	15.00 to 15.50
Low phos. steel, eastern Pa.	14.50 to 15.00

MISCELLANEOUS SHOP TOOLS

	Discount
Standard files	80 and 5
Heavy hammers, 3 to 5 lb.	80 and 10
Heavy hammers, over 5 lb.	80 and 5
Gas pliers, 7-inch, per dozen	$2.00
Gas pliers, 12-inch, per dozen	3.50
Cold chisels, per pound	13c to 15c
Wrenches, Alligator, discount	75 and 80
Wrenches, drop forged S	50 and 10

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The Iron Trade Review
Cleveland, Ohio

New Direct Current Generators

(*Continued from page 600*)

the stationary compensator, requires fewer collector rings and brushes, and reduces the number of cable leads to the switchboard.

Particular attention has been given to the ventilation of these machines. Armature cores, windings, spiders and flanges, commutator shells and all field coils are of the open construction, allowing a free circulation of air through and around all component parts, which assures low temperatures, good efficiency and durability of the insulation. The magnet frame is cast steel, split horizontally above the center line, so that the generator can be taken apart for cleaning, inspection or repair without removing any of the field poles.

Main Poles

The main poles are of laminated steel, punched to suit the finished frame and held in place by bolts. The main field is constructed with the series coil mounted outside the shunt coil, and is separated a sufficient distance to permit thorough ventilation and insure easy access tc either coil. The shunt coil is thoroughly insulated on a sheet metal body and is supported by heavy insulating collars. The commutating poles are of rolled steel held in place by bolts and carry a helical winding of edgewise-wound copper strip, insuring effective radiation of heat. Either main or commutating poles with their coils are readily removed without interfering with the magnet frame or brush rigging.

The armature windings, either multiple or series, as best suits the design, are formed from bar stock in coils of endless type, without joints or clips on the back end; and the design of the coil is such that free circulation of air is obtained around and through the end windings. An improved wrapped type of insulation supersedes the trough type used on previous designs. The windings are held in the slots by hardwood wedges dovetailed in the punchings, and on the ends by binding bands, which do not, however, extend over the core. The end connections are supported by flanges bolted to the armature spider. Suitable equalizer connections are provided on all multiple wound armatures to prevent any difference in voltage due to variation in the air gap, and also to equalize the magnetic pull on the shaft.

The brush rigging is of an improved mechanical design, the yoke fitting closely in a groove turned in the magnet frame.

The design of the brush-holder embodies distinctive features. The brush-holder body is a single piece brass casting bored for the stud fit, while the broached box offers a long bearing surface that eliminates grooving of the brush. The punched steel lever is rigid and maintains its relation to the brush irrespective of wear. Tension is obtained by a steel wire spring, the design allowing a wide range of adjustment for brush pressure. A metal cap riveted to the brush avoids wear at the point of contact with the spring lever. A flexible copper connection with ample contact surface is supplied for carrying the current to avoid deterioration of the brush-holder spring.

The mine production of gold in South Dakota in 1913, according to preliminary estimates by Charles W. Henderson, of the United States geological survey, was $7,200,000, which is $691,370 less than the record yield of $7,891,370 in 1912. The 1913 output, however, is above the yearly average for the last decade. The silver production fell from 206,460 ounces to 164,800 ounces. A nominal quantity of lead and copper was produced.

Treating Ingots With Aluminum

(*Continued from page* 588)

composition of the steel was reached at about one-third of the height from the top end, after which the wall remained of about uniform composition.

In the drop tests, the use of aluminum in general was attended with a considerable increase in ductility in the upper part of the bar, where the ductility was low in the plain steel, especially with the higher carbon. The addition of silicon had a similar effect, especially with the 0.2 per cent addition. With the 0.45 per cent carbon steel, the average ductility of the whole bar was about the same in the aluminum treated as in the plain steel. With the 0.61 per cent carbon steel, the average ductility was considerably greater in the aluminum treated bars.

The aluminum additions and the larger addition of silicon were attended with interior flaws extending downward a considerable distance (as high as 30 to 45 per cent of the weight of the ingot) from the top end of the bar, while with plain steel interior laminations as seen in the fractures of the drop test pieces were absent or close to the top end. The aluminum and silicon additions, it will be remembered, were made to the molds while pouring the steel and whether the interior laminations in the rails would occur in the same way if the additions were made to the ladle before pouring the steel into the molds, this investigation does not show.

Transverse Tests

Transverse tests of the base were made by supporting pieces of rail 2 feet long, on two supports placed opposite each other near the edges of the flanges under the middle of the length of the piece tested. The supports were 6 inches long and were placed ½ inch in from the sides of the flanges. The load was applied in the test machine to the head of the rail at the middle.

With the 0.61 per cent carbon steel, treatment with 2 ounces of aluminum was attended with considerable increase in transverse strength and sag of flange before breaking. With treatments with 5 ounces and 10 ounces of aluminum per ton of steel, there were some further increases. With the 0.45 per cent carbon steel, there were small increases in transverse strength and sag of flange with the aluminum treatment as against plain steel.

To sum up, ingots treated with aluminum as a mold addition, were of more even composition throughout the ingot than plain Bessemer steel. There was less positive segregation in the interior and upper part of the ingot, but the negative segregation in the interior and lower parts of the ingot was about the same. There was a softening or negative segregation in the upper part of the wall of the plain ingot while in the aluminum treated ingots, the walls were of fairly even composition throughout the height of the ingot. Aluminum treated ingots had larger and deeper pipes than plain steel, but had denser steel around the pipes.

Rails of plain steel had a brittle zone in the upper part of the bar as disclosed by the drop test. In the rails of aluminum treated steel this zone was largely eliminated. Rails of plain steel contained their laminations close to the top end of the bar, while in aluminum treated rails, the interior laminations were found a considerable distance from the top end, varying from about 30 to 45 per cent of the weight of the ingot. In the transverse test of the base, rails of aluminum treated steel showed considerably greater transverse strength of the base and sag of the flange before breaking than the rails of plain steel, with 0.61 per cent carbon and a little greater strength and sag of flange with 0.45 per cent carbon.

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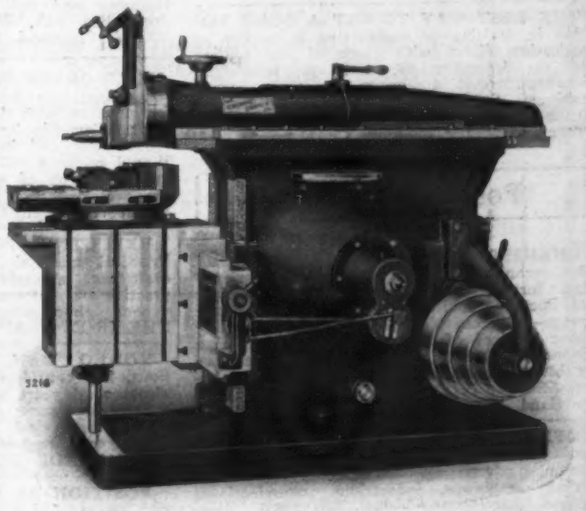

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